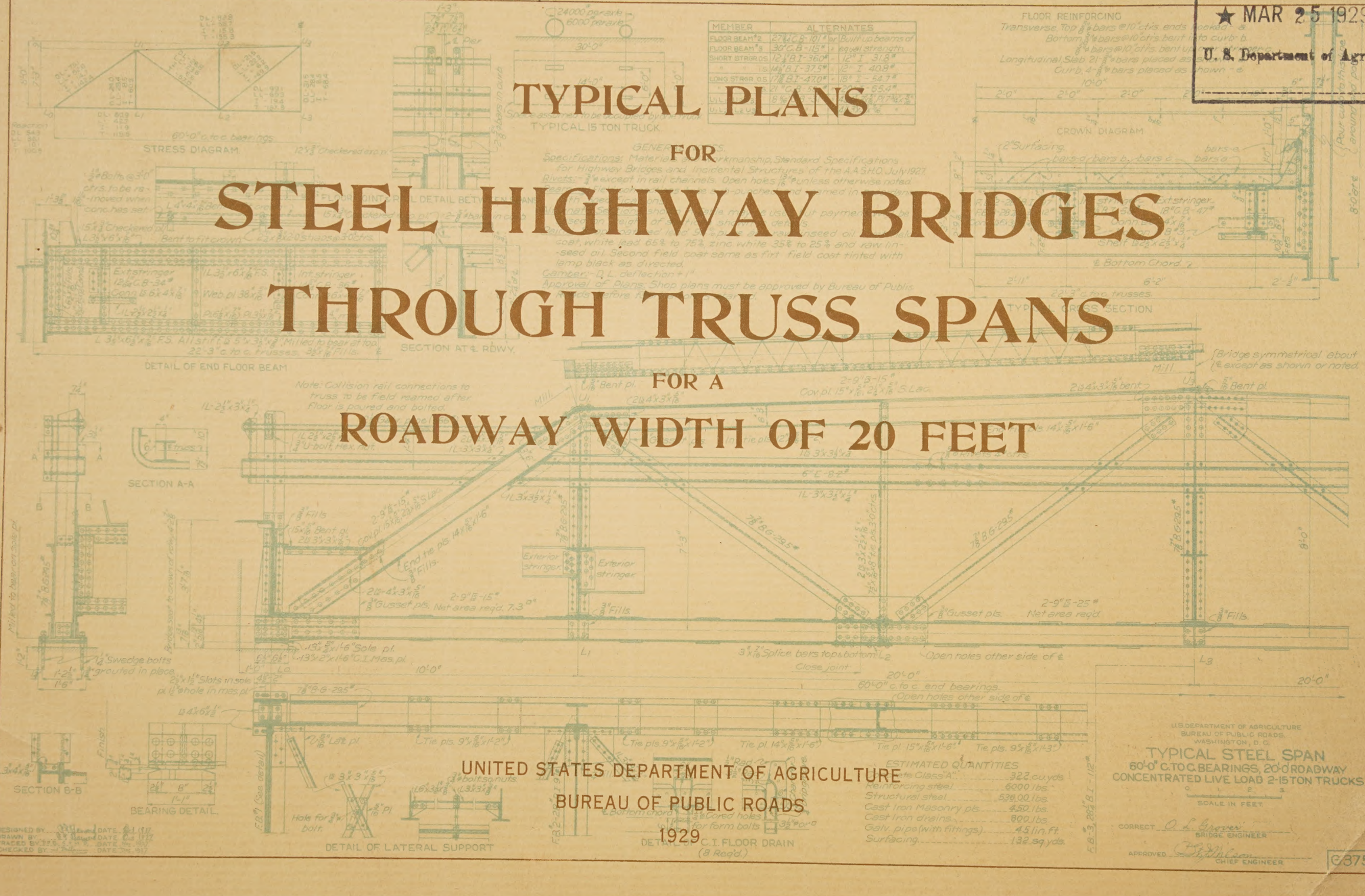
U.S. - AGRICULTURE, DEPT. OF. - PUBLIC ROADS, BUREAU OF.

Typical plans for steel highway bridges through truss spans for a roadway width of 20 feet.

1929

U. S. GOVERNMENT PRINTING OFFICE: 1927 8—1577

TYPICAL PLANS
FOR
STEEL HIGHWAY BRIDGES
THROUGH TRUSS SPANS
FOR A
ROADWAY WIDTH OF 20 FEET



UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS
1929

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS
WASHINGTON, D. C.

TYPICAL STEEL SPAN
60'-0" C. TO C. BEARINGS, 20'-0 ROADWAY
CONCENTRATED LIVE LOAD 2-15 TON TRUCKS

SCALE IN FEET

CORRECT O. L. Grover
BRIDGE ENGINEER

APPROVED H. S. Wilson
CHIEF ENGINEER

C-875

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INTRODUCTION

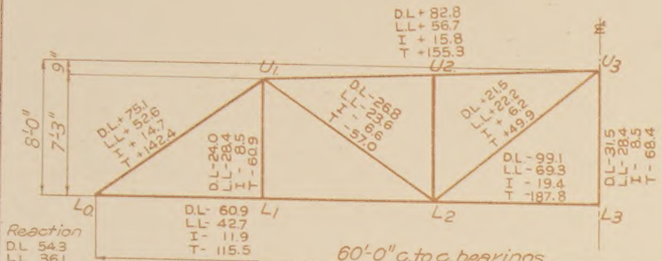
This publication contains designs and general details for simple truss span highway bridges designed to carry the H-15 loading and conforming generally to the Standard Specifications for Highway Bridges of the American Association of State Highway Officials dated July 1, 1927. The designs are adequate to carry a concrete floor with an additional pavement load of 25 pounds per square foot corresponding to a 2-inch bituminous pavement, and a concentrated live load of two 15-ton trucks.

The span lengths shown begin at 60 feet and continue at intervals of 20 feet up to 200 feet followed by spans of 225 and 250 feet. All designs are for a roadway of 20 feet.

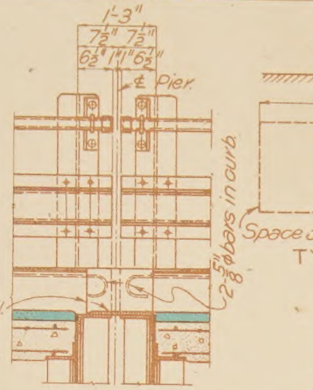
Symmetrical sections and solid rolled sections have been used wherever practicable because of the favorable distribution of stress, economy in shop work and ease of painting, and lacing bars thus generally avoided. The omission of lacing bars on truss web members has made it desirable to add cross bars on one of the diagonals to serve as steps for climbing to the top chord.

A crown on the roadway floor of 1½inches is used and drains are shown under the curb at frequent intervals to carry the water away from the floor and discharge it below without coming into contact with any bridge steel.

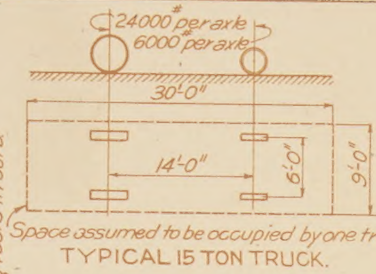
While certain particular sections are shown for members, tables of available alternate sections are also given for the benefit of those who desire to use them.



STRESS DIAGRAM.



FLOOR JOINT & RAIL DETAIL BETWEEN SPANS



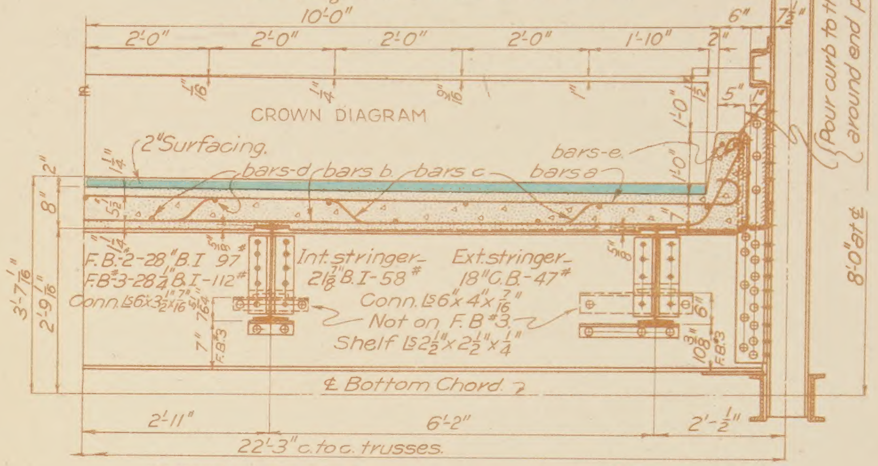
TYPICAL 15 TON TRUCK.

MEMBER	ALTERNATES		
FLOOR BEAM #2	27 1/64" C.B-101#	or	Built up beams of
FLOOR BEAM #3	30" C.B-115#	"	equal strength.
SHORT STR'GR. O.S.	12¼" B.I-36.0#	"	12" I 31.8#
" " I.S.	14⅛" B.I-37.5#	"	12" I 40.8#
LONG. STRGR. O.S.	17 15/16" B.I-47.0#	"	18" I-54.7#
" " I.S.	21" C.B-58#	"	20" I-65.4#
U1L1-U3L3	8 1/16" C.B.-31#	"	4 Ls 4"x3"x5/16", Pl. 7¾"x5/16"
U1L2-L2U3	" "	"	4 Ls 3"x3"x5/16" "

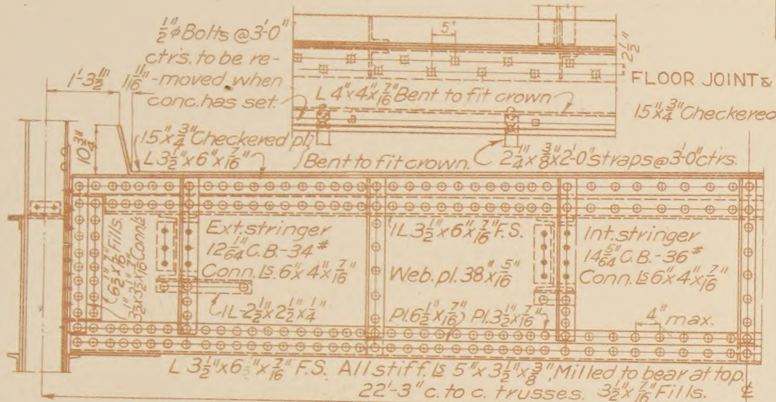
GENERAL NOTES.

Specifications: Materials and workmanship, Standard Specifications for Highway Bridges and Incidental Structures' of the A.A.S.H.O. July 1927.
Rivets: -¾"ϕ except in rail channels. Open holes 13/16"ϕ unless otherwise noted.
Reaming: Field connections to be sub-punched and reamed in accordance with Specifications.
Alternate Sections, shown in Table may be used but payment will be based on weight of sections shown in details.
Paint: Shop coat, red lead 95% pure and raw linseed oil. First field coat, white lead 65% to 75%, zinc white 35% to 25% and raw lin--seed oil. Second field coat same as firt field coat tinted with lamp black as directed.
Camber: - D.L. deflection + 1"
Approval of Plans: Shop plans must be approved by Bureau of Public Roads before fabrication is started.

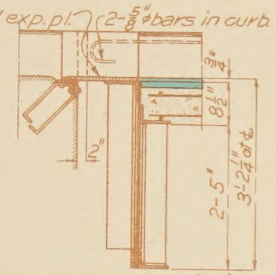
FLOOR REINFORCING
Transverse, Top ⅝"ϕ bars @ 10" ctrs. ends hooked - a.
Bottom ⅝"ϕ bars @ 10" ctrs. bent into curb - b.
⅝"ϕ bars @ 10" ctrs. bent up over stringer - c.
Longitudinal, Slab. 21-⅜"ϕ bars placed as shown - d.
Curb, 4-⅝"ϕ bars placed as shown - e.



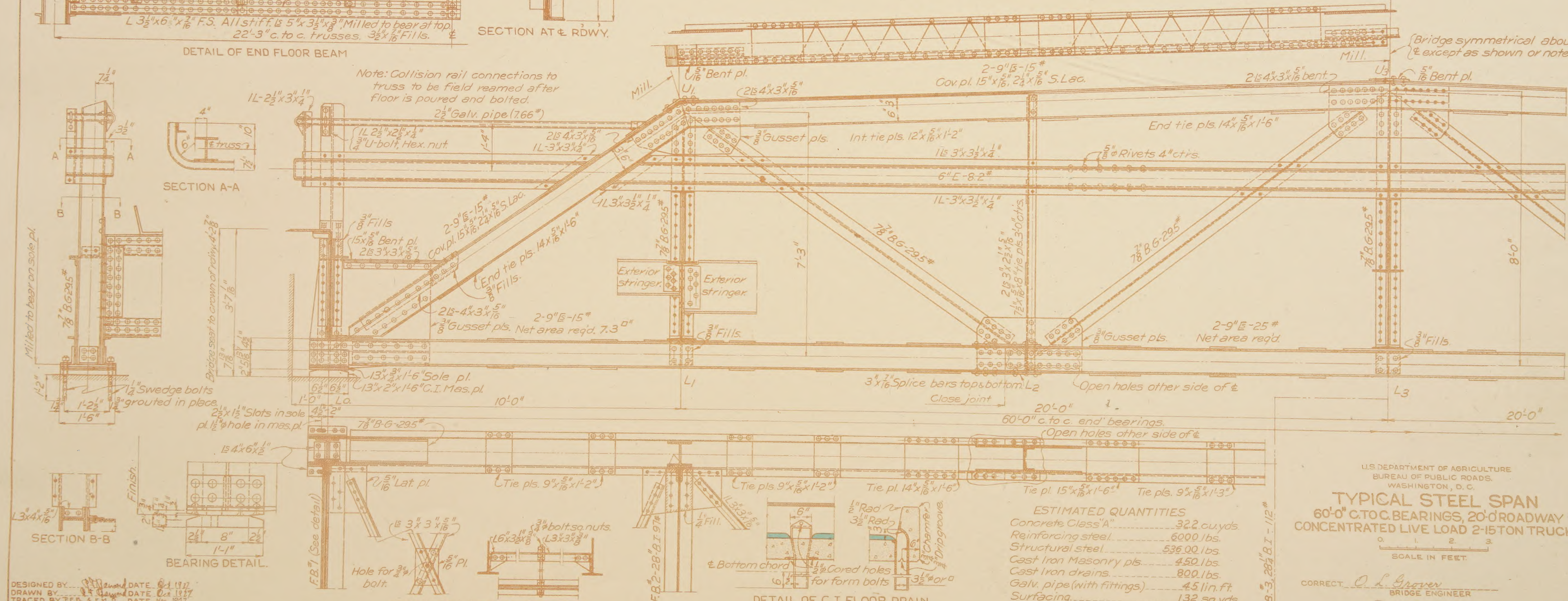
TYPICAL CROSS SECTION



DETAIL OF END FLOOR BEAM



SECTION AT ℄ RDWY.



SECTION A-A

SECTION B-B

BEARING DETAIL.

DETAIL OF LATERAL SUPPORT

DETAIL OF C.I. FLOOR DRAIN
(8 Req'd.)

ESTIMATED QUANTITIES

Concrete Class "A"	32.2 cu. yds.
Reinforcing steel	6000 lbs.
Structural steel	536.00 lbs.
Cast Iron Masonry pls.	450 lbs.
Cast Iron drains	800 lbs.
Galv. pipe (with fittings)	45 lin. ft.
Surfacing	132 sq. yds.

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS.
WASHINGTON, D. C.

TYPICAL STEEL SPAN
60'-0" C. TO C. BEARINGS, 20'-0" ROADWAY
CONCENTRATED LIVE LOAD 2-15 TON TRUCKS.

0. 1. 2. 3.
SCALE IN FEET.

CORRECT O. L. Grover
BRIDGE ENGINEER

APPROVED B. H. Wilson
CHIEF ENGINEER.

DESIGNED BY P. T. Howard DATE Oct 1927
DRAWN BY P. T. Howard DATE Oct 1927
TRACED BY P.F.B. & M.B. DATE Nov. 1927
CHECKED BY [signature] DATE Dec. 1927

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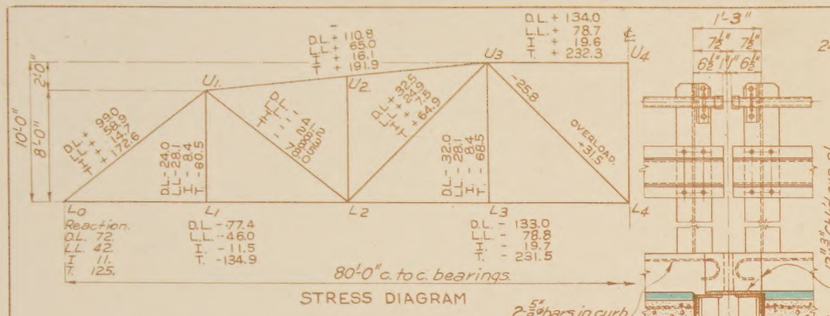
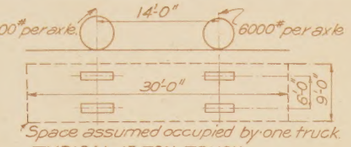


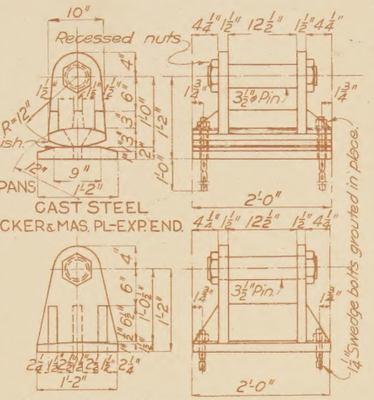
STRESS DIAGRAM

FLOOR & RAIL JOINT BETWEEN SPANS



Space assumed occupied by one truck.

TYPICAL 15 TON TRUCK.



CAST STEEL ROCKER & MAS. PL-EXP. END.

CAST STEEL SHOE-FIXED END.

GENERAL NOTES

Specifications: Materials and workmanship: Standard Specifications for Highway Bridges and Incidental Structures of the A.A.S.H.O. July, 1927.

Rivets: ⅞" ø except in rail Ls. Open holes 13/16" ø

Reaming: Field connections to be sub-punched and reamed in accordance with the specifications.

Alternate Sections, shown in the table may be used but payment will be based on the weight of sections shown in details.

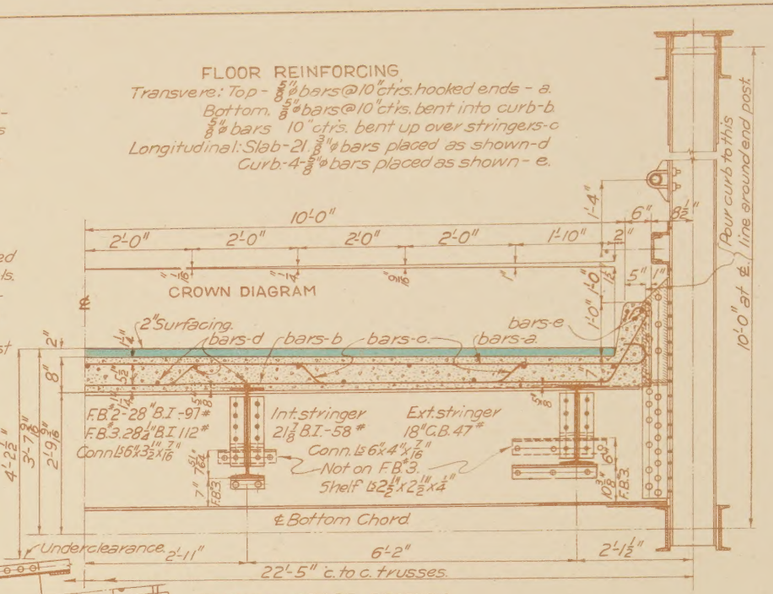
Paint: Shop coat red lead 95% and raw linseed oil. First field coat, white lead 65% to 75% zinc white 35% to 25% and raw linseed oil. Second field coat same as first field coat tinted with lampblack as directed.

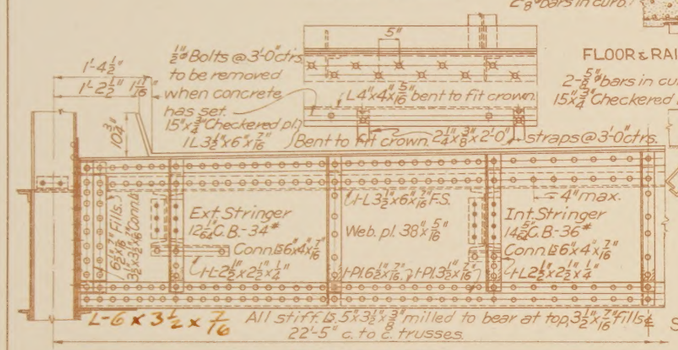
Camber: D.L. deflection + 1¼"

Approval of Plans: Shop plans must be approved by the Bureau of Public Roads before fabrication is started.

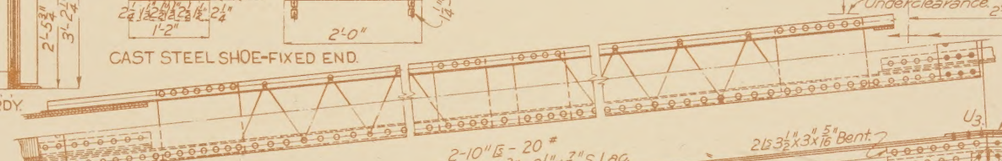
FLOOR REINFORCING

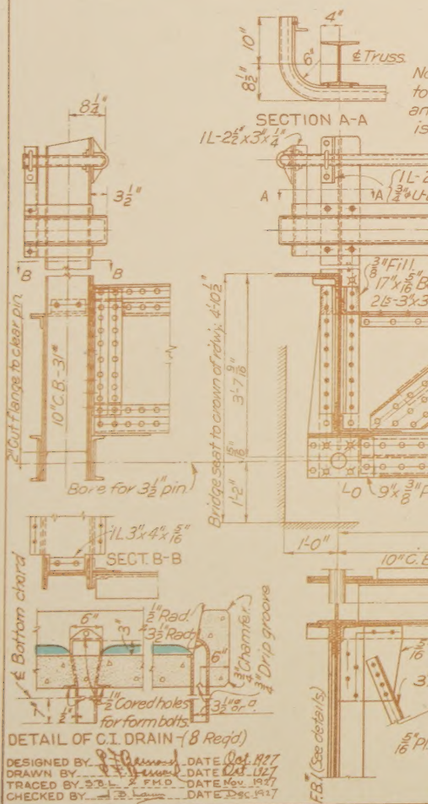
Transverse: Top - ⅝" ø bars @ 10" ctrs. hooked ends - a.
Bottom, ⅝" ø bars @ 10" ctrs. bent into curb - b.
⅝" ø bars 10" ctrs. bent up over stringers - c
Longitudinal: Slab - 21 ⅜" ø bars placed as shown - d
Curb - 4 ⅝" ø bars placed as shown - e.

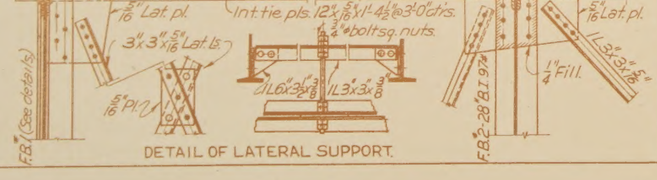




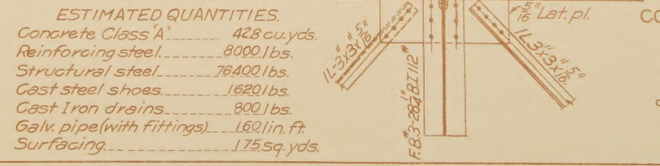
DETAIL OF END FLOOR BEAM







DETAIL OF LATERAL SUPPORT.



MEMBER	ALTERNATES	
FLOOR BEAM # 2	27¾ C.B 101#	Built up beam of equal strength.
FLOOR BEAM # 3	30" C.B. 115#	
SHORT STR'GR. O.S.	12¼" B.I. 36.0#	12" I - 31.8#
" " I.S.	14⅛" B.I - 37.5#	12" I - 40.8#
LONG STR'GR. O.S.	17⅞" B.I. - 47#	18" I - 54.7#
" " I.S.	21" C.B - 58#	20" I - 65.4#
U1 L1, U3 L3	9 3/32" B.G 41.5#	4 Ls 4½"x3½"x⅝", Pl 9"x⅞"
U1 L2, L2 U3	" " "	" " "
U3 L4	8 15/16" B.G - 36#	4 Ls 3½"x3"x5/16", Pl 9"x⅝"

ESTIMATED QUANTITIES.

Concrete Class 'A'	42.8 cu. yds.
Reinforcing steel	8000 lbs.
Structural steel	76400 lbs.
Cast steel shoes	1620 lbs.
Cast Iron drains	800 lbs.
Galv. pipe (with Fittings)	160 lin. ft.
Surfacing	175 sq. yds.

U.S. DEPARTMENT OF AGRICULTURE.
BUREAU OF PUBLIC ROADS.
WASHINGTON, D. C.

TYPICAL STEEL SPAN

80'-0" C. TO C. BEARINGS, 20'-0" ROADWAY.
CONCENTRATED LIVE LOAD 2-15 TON TRUCKS.

LAYOUT SCALES IN FEET 0 1 2 3
DETAILS 0 1 2 3

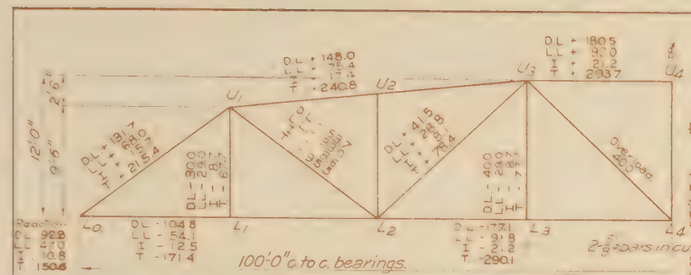
CORRECT. O. L. Grover
BRIDGE ENGINEER

APPROVED. [illegible]
CHIEF ENGINEER

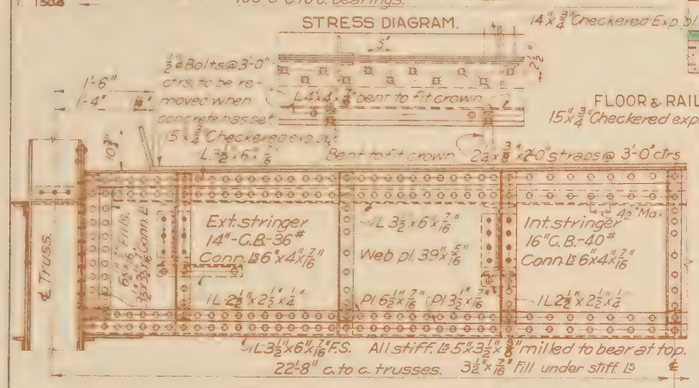
DESIGNED BY. [illegible] DATE Oct. 1927
DRAWN BY. [illegible] DATE Oct. 1927
TRACED BY. [illegible] DATE Nov. 1927
CHECKED BY. [illegible] DATE Dec. 1927

G-376.

Rev. 4-19-28

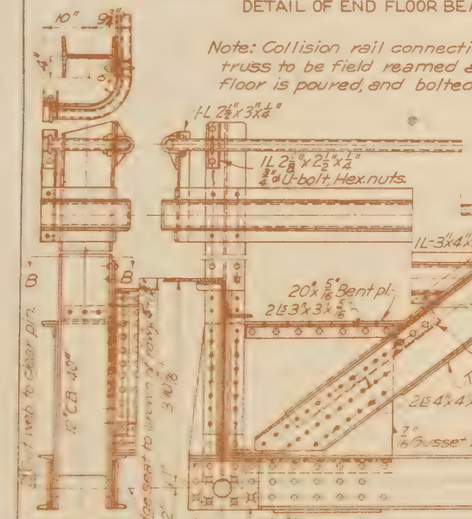


STRESS DIAGRAM.

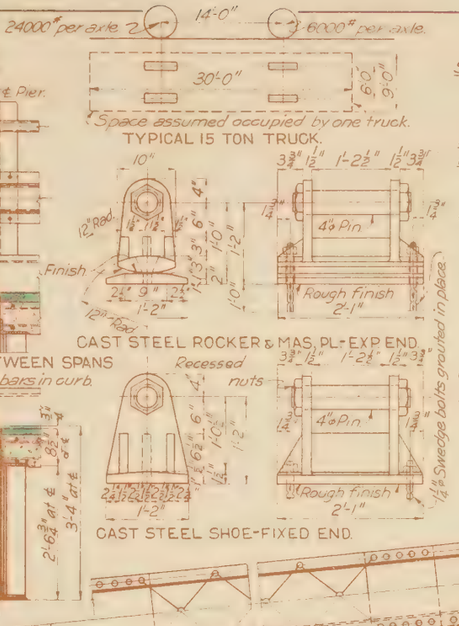


DETAIL OF END FLOOR BEAM

Note: Collision rail connections to truss to be field reamed after floor is poured, and bolted.



DETAIL OF LATERAL SUPPORT



GENERAL NOTES

Specifications: Materials and workmanship "Standard Specifications for Highway Bridges and Incidental Structures" of A.A.S.H.O. July, 1927.

Rivets: 7/8" ø except in rail ℄s. Open holes 13/16".

Reaming: Field connections to be sub-punched and reamed according to Specifications.

Alternate Sections shown in table may be used but payment will be based on wt. of sections shown in details.

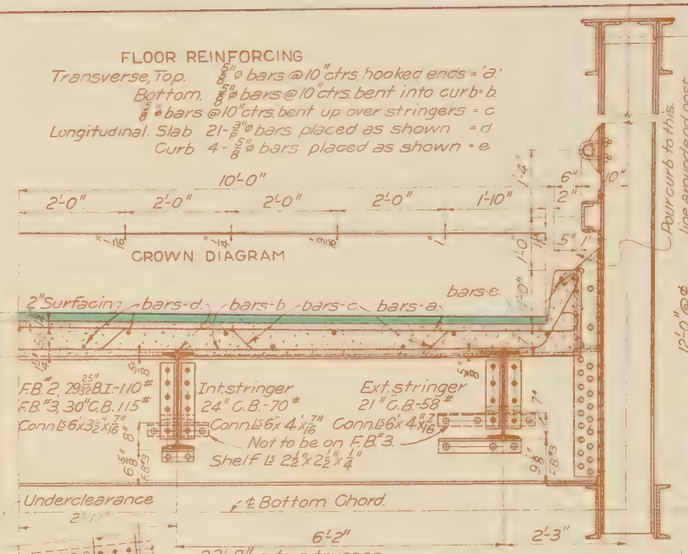
Paint: Shop coat red lead 95% pure and raw linseed oil. First field coat, white lead 65% to 75%, zinc white 35% to 25% and linseed oil. Second field coat same as first field coat tinted with lamp black as directed.

Camber: D. L. deflection plus 1/2".

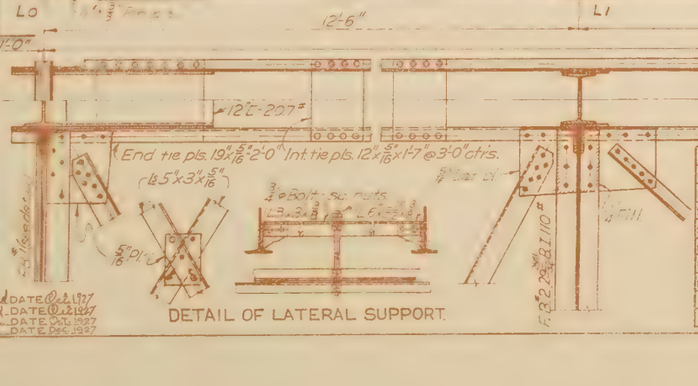
Approval of Plans: Shop plans must be approved by the Bureau of Public Roads before fabrication is started.

FLOOR REINFORCING

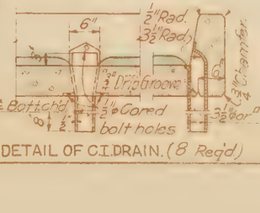
Transverse, Top. 5/8" ø bars @ 10" ctrs. hooked ends = a.
Bottom. 5/8" ø bars @ 10" ctrs. bent into curb = b.
5/8" ø bars @ 10" ctrs. bent up over stringers = c.
Longitudinal. Slab 21-3/4" ø bars placed as shown = d.
Curb 4-5/8" ø bars placed as shown = e.



TYPICAL CROSS SECTION



MEMBER	ALTERNATE S.
FLOOR BEAM # 2.	30" C.B-115# & Built up section of equal strength
FLOOR BEAM # 3.	29 25/32" B.I-115# "
SHORT STRS. O.S	14 1/8" B.I. 37.5# " 15" I 42.9#
SHORT STRS. I.S	16" B.I-40# " 15" I-55#
LONG STRS. O.S	19 1/8" B.I-56# " 20" I 65.4#
LONG STRS. I.S.	23 1/8" B.I-70# " 24" I 79.9#
U1-L1-U1-L2-L2-U3	11" x 32" @ 65.5# " 4 L's 4" x 3" x 5/16" Pl. 11" x 5/16"
U3 L3	" " " " 4 L's 4" x 3" x 3/8" " "
U3 L4	24" B.I. 360# " 4 L's 3" x 3" x 7/16" " "



Int. tie pls. 12" x 5/16" x 1'-7 1/2" @ 3'-0" ctrs.

ESTIMATED QUANTITIES

Concrete Class 'A'	538 cu. yd.
Reinforcing steel	10100 lbs.
Structural steel	103000 lbs.
Cast steel shoes	1670 lbs.
Cast iron drains	800 lbs
Galv. pipe & fittings	200 lin. ft.
Surfacing	219 sq. yds.

U.S. DEPARTMENT OF AGRICULTURE.
BUREAU OF PUBLIC ROADS
WASHINGTON, D.C.

TYPICAL STEEL SPAN
100'-0" C. TO C. BEARINGS 20'-0" ROADWAY. CONCENTRATED LIVE LOAD 2-15 TON TRUCKS.

LAYOUT. SCALES IN FEET. 0 1 2 3
DETAILS. SCALES IN FEET. 0 1 2 3

CORRECT O. A. Grover
BRIDGE ENGINEER.
APPROVED Thos. H. MacDonald
CHIEF ENGINEER.

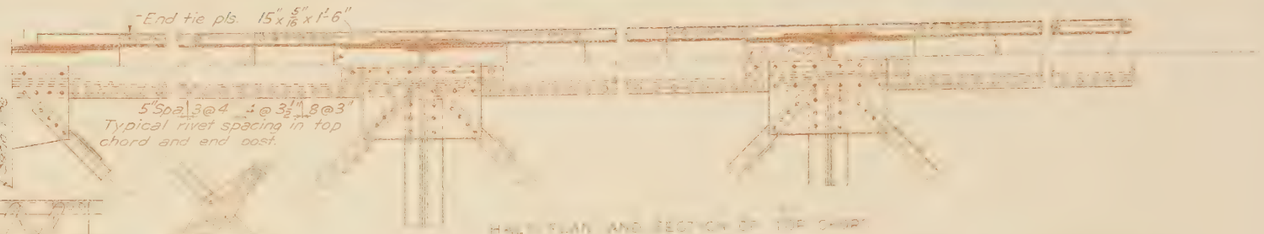
G-377.

DESIGNED BY O. Hansen DATE Oct 1927
DRAWN BY E. Hansen DATE Oct 1927
TRACED BY E. P. A. S. DATE Oct. 1927
CHECKED BY C. R. Gutler DATE Dec. 1927

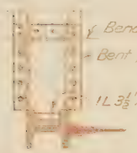
Rev. 4-19-28.

CLEARANCE DIAGRAM.

TOP LATERALS
2 Ls 3½"x3½"x⅝" S.L. 2⅛" x 5/16
End tie pls. 8"x 5/16", 10"
5/16" Lateral pls.

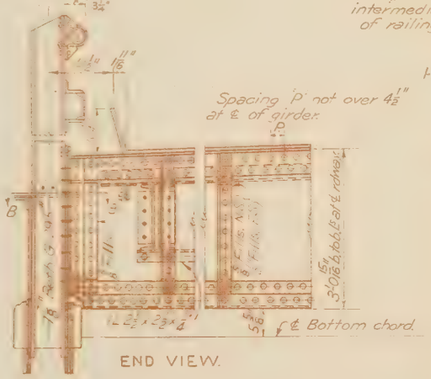


HALF PLAN AND SECTION OF TOP CHORD



SECTION B-B
INTERMEDIATE TERMINAL OF RAILING.

END TERMINAL OF RAILING.

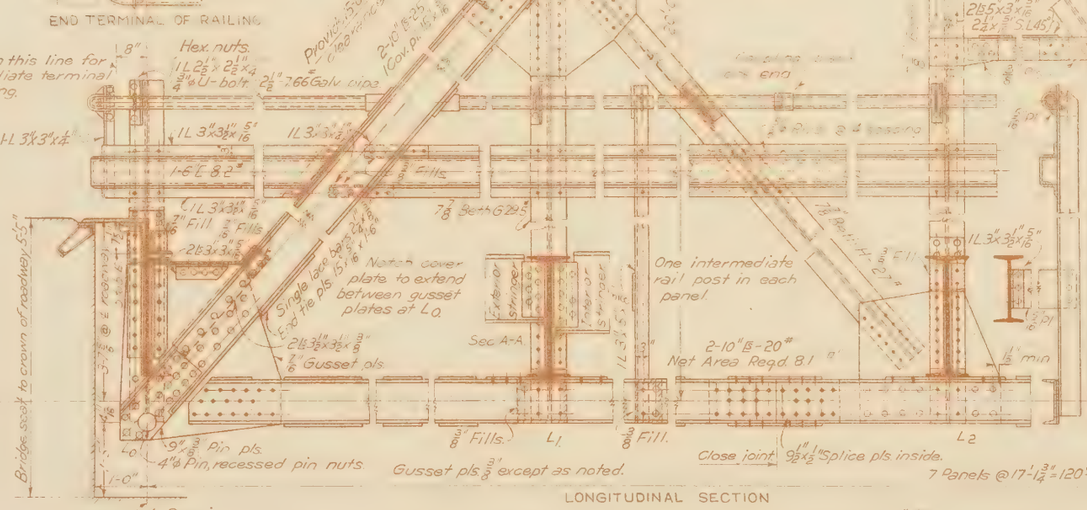


END VIEW.

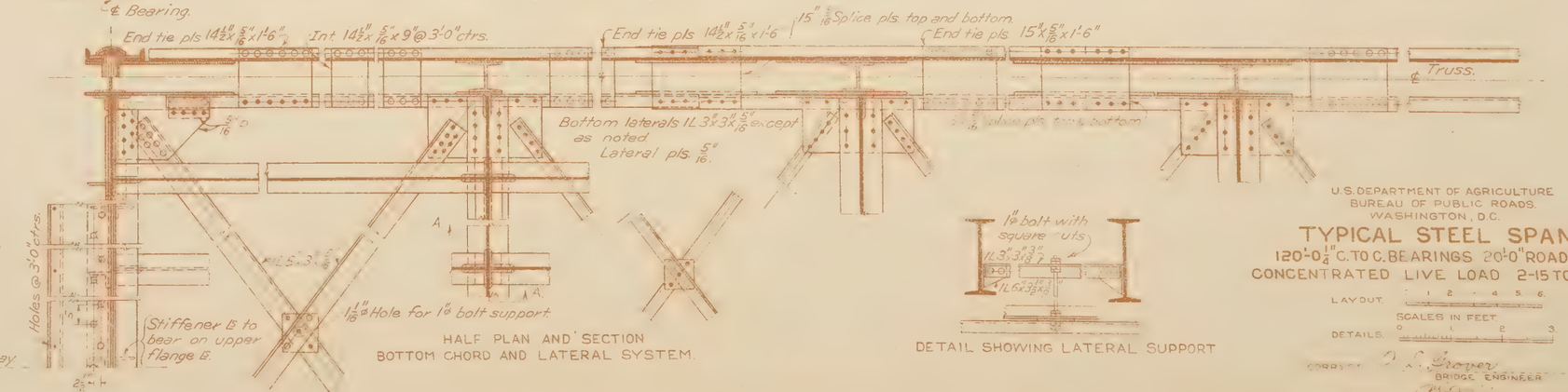
END FLOOR BEAM

¼" Checkered expansion plate bent to fit crown of roadway, bevel edge.
Top flange inside 1 L 6" x 4" x ½" bent.
Top flange outside 1 L 6" x 6" x ⅝" bent.
Bottom flange inside 1 L 6" x 3½" x ½".
Bottom flange outside 1 plate 6½" x ⅝", 1 plate 3½" x ¾".
Connection Ls 3½" x 3½" x 7/16", 4 fills 6½" x ⅝".
10 Stiffener Ls 5" x 3" x ⅝", 7 fills 3" x ⅝", 3 fills 3" x ½".
Web plate 36" x ⅜" cut to crown of roadway.

Bring backwall angle into proper position by bolting to expansion plate, then bolt securly to forms and remove bolts through the expansion plate before casting concrete.



LONGITUDINAL SECTION



HALF PLAN AND SECTION
BOTTOM CHORD AND LATERAL SYSTEM.

DETAIL SHOWING LATERAL SUPPORT

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS.
WASHINGTON, D.C.

TYPICAL STEEL SPAN

120'-0 1/4" C. TO C. BEARINGS 20'-0" ROADWAY
CONCENTRATED LIVE LOAD 2-15 TON TRUCKS.

LAYOUT 1 2 4 5 6
SCALES IN FEET
DETAILS 0 1 2 3

DESIGNED BY W. W. Moyer DATE Aug 1937
DRAWN BY P. Lapetina DATE " "
TRACED BY P. Lapetina DATE " "
CHECKED BY C. D. Curtiss DATE Oct "

CONCURRED: D. C. Greiner, BRIDGE ENGINEER
APPROVED: [illegible], CHIEF ENGINEER

Sheet 1 of 2.

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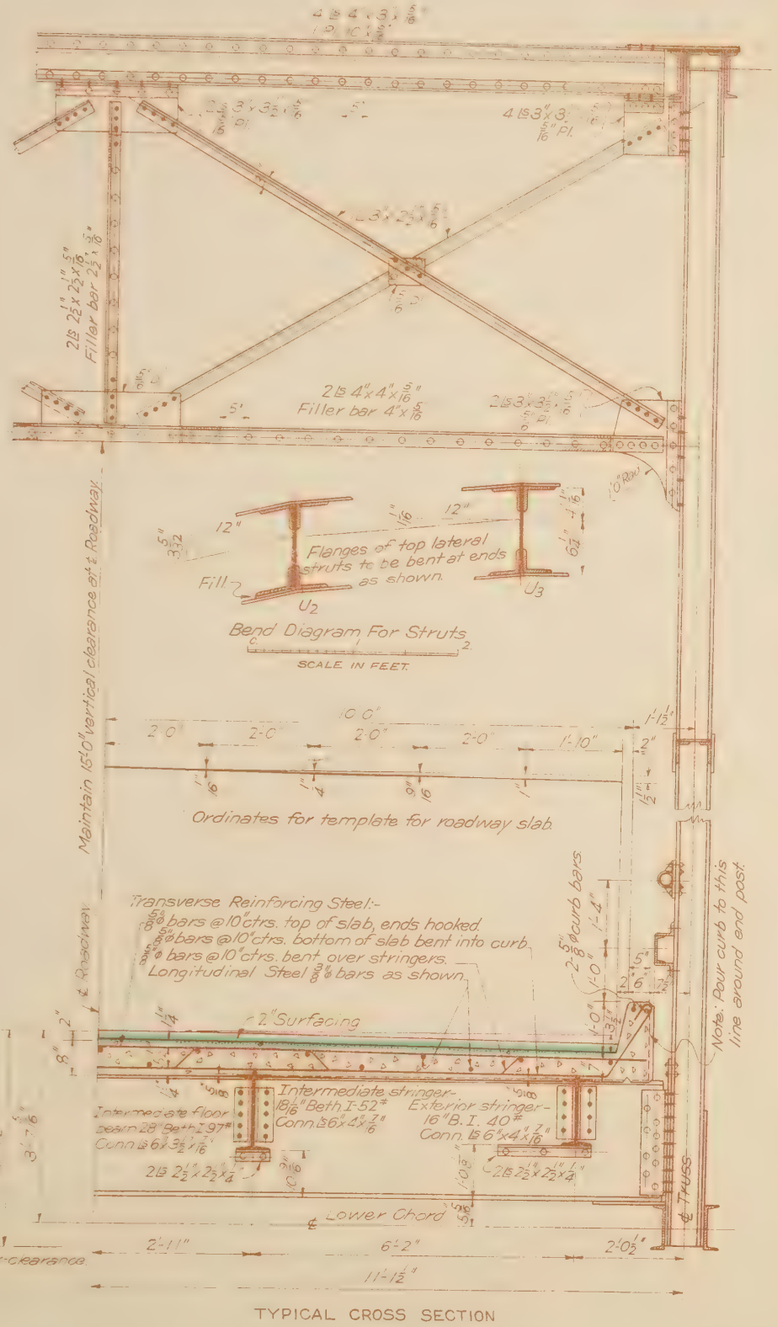
Rev. 4-15-41



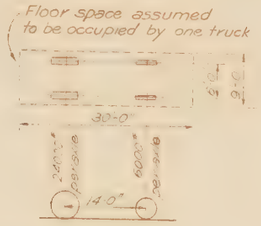
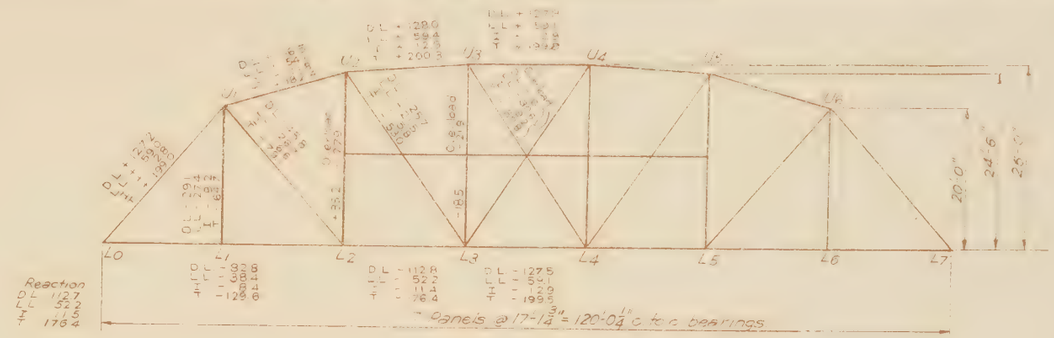
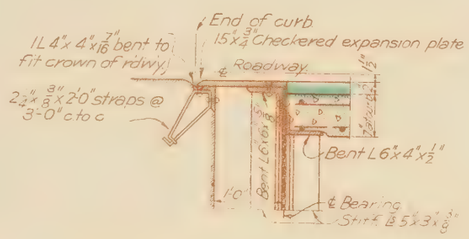


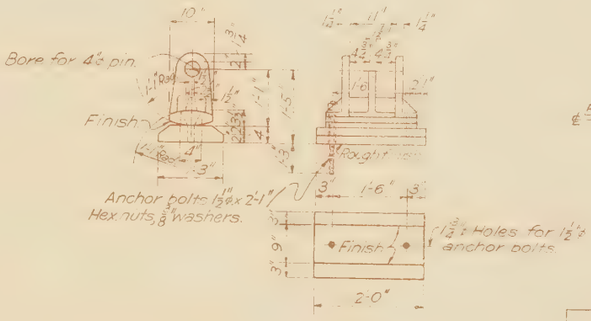
DIAGRAM OF TYPICAL 15 TON TRUCK.



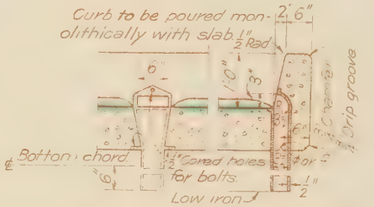
STRESS DIAGRAM



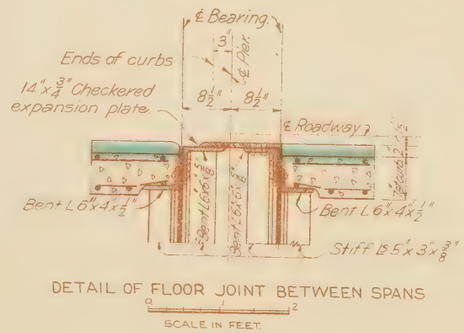
DETAIL OF END FLOOR JOINT



CAST STEEL ROCKER - EXPANSION END

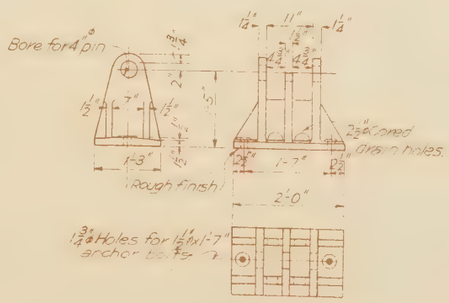


DETAIL OF CAST IRON DRAIN PIPE
10 Req'd.



DETAIL OF FLOOR JOINT BETWEEN SPANS

SCALE IN FEET.



CAST STEEL SHOE. FIXED END.

GENERAL NOTES

Specifications: Materials and workmanship Standard Specifications for Highway Bridges and Incidental Structures of the A.A.S.H.O. July 1, 1927.

Rivets: ⅞" ϕ Open holes 1 3/16" ϕ except as noted.

Reaming: Field connections to be sub-punched and reamed according to Specifications.

Alternate Sections shown in Table may be used but payment will be based on weights shown on details.

Camber: D.L. deflection +1¼".

Paint: Shop coat red lead 95% pure and raw linseed oil. First field coat white lead 65% to 75%, zinc white 35% to 25% and raw linseed oil. Second field coat same as first field coat tinted with lamp black as directed.

Approval of Plans. Shop plans must be approved by the Bureau of Public Roads before fabrication is started.

TABLE SHOWING ALLOWABLE ALTERNATE SECTIONS

* Turn long legs of angles out

MEMBER	AMER. STD. SEC.	CARNEGIE
INT. FLOOR BEAMS *	4 ls 6"x4"x⅜" Web Pl 28"x⅜"	27"ϕ C.B. 101#
INSIDE STRINGERS	18" I - 60#	18"ϕ C.B. 52#
OUTSIDE STRINGERS	15" I - 50#	16" C.B. 40#
U1-L1, U2-L2, U3-L3*	4 ls 3½"x3½"x⅝" 1 Pl 7½"x⅝"	8"ϕ C.B. 31#
U1-L2, U2-L3	do	8"ϕ C.B. 31#

ESTIMATE OF QUANTITIES.

Concrete Class A	64.4 cu. yds.
Reinforcing steel	12000 lbs.
Structural steel	129000 lbs.
Cast steel shoes	2400 lbs.
Cast iron drains	1100 lbs.
Surfacing	263 sq. yds.
Galvanized pipe (with fittings)	244 lin. ft.

U. S. DEPARTMENT OF AGRICULTURE.
BUREAU OF PUBLIC ROADS.
WASHINGTON, D. C.

TYPICAL STEEL SPAN
120'-0¼" C. TO C. BEARINGS-20'-0" ROADWAY
CONCENTRATED LIVE LOAD 2-15 TON TRUCKS

0 1 2 3 4 5
SCALE IN FEET.

CORRECT — C. H. Grover — BRIDGE ENGINEER

APPROVED — [signature] — CHIEF ENGINEER

DESIGNED BY M. W. Morgan DATE Aug. 1927.
DRAWN BY [illegible] DATE [illegible]
TRACED BY [illegible] DATE [illegible]
CHECKED BY C.H.Grover DATE Oct. 1927

Sheet 2 of 2

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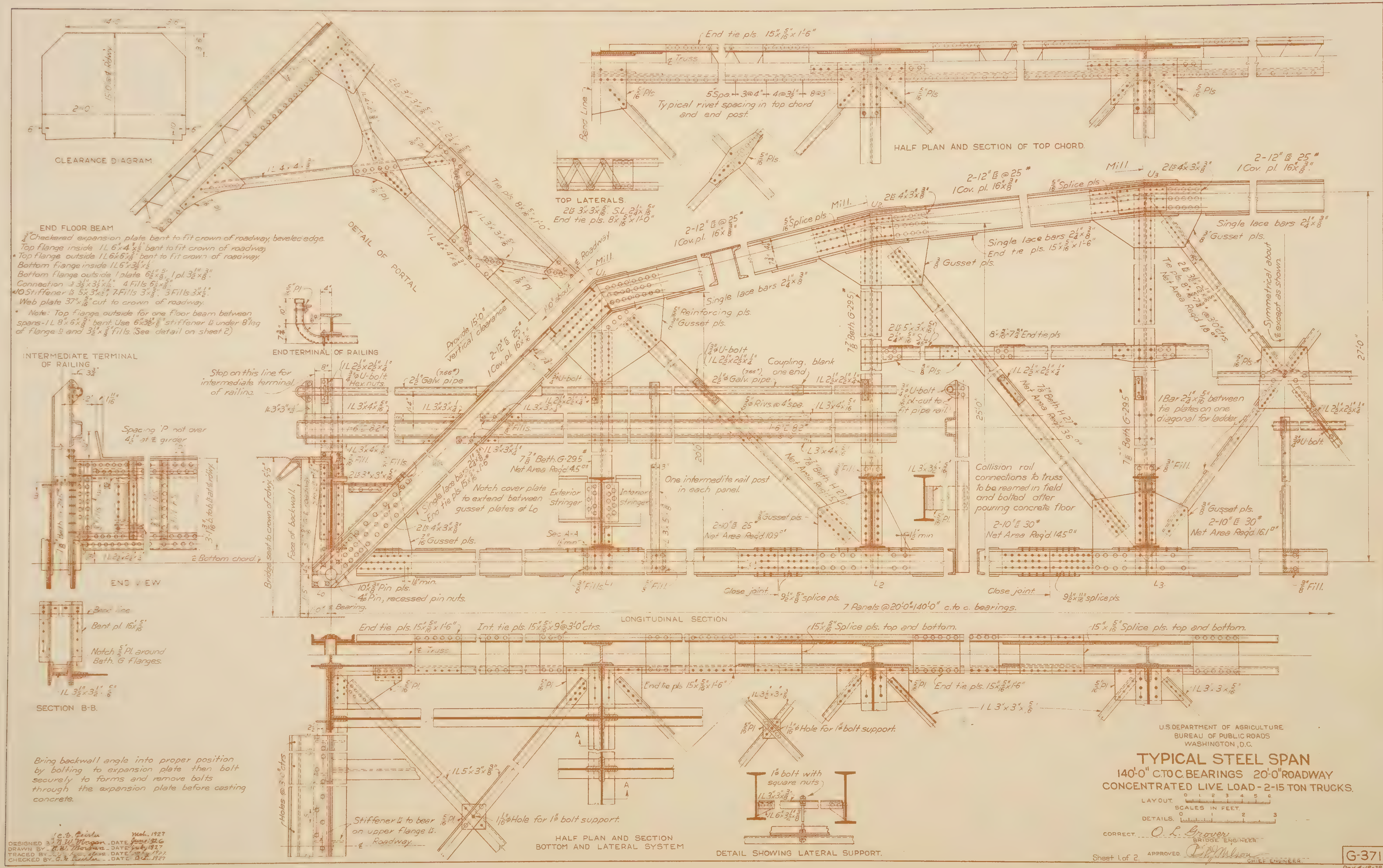
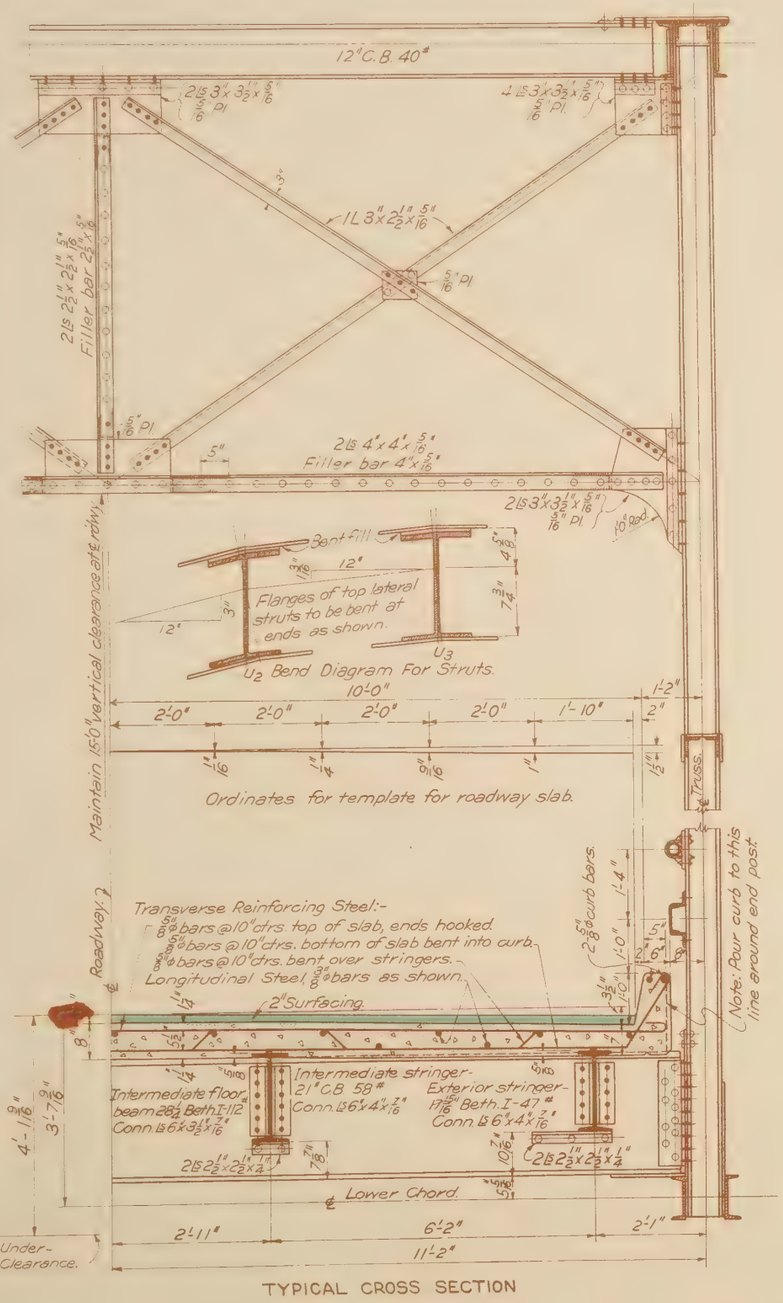
Retraced FMD 4-18-28


CLEARANCE DIAGRAM
DETAIL OF PORTAL
TOP LATERALS.
2∟s 3½"x3½"x5/16" S.L. 2½"x2½"x5/16"
End tie pls. 8"x5/16"x1'-0"
HALF PLAN AND SECTION OF TOP CHORD.
End tie pls. 15"x5/16"x1'-6"
Typical rivet spacing in top chord and end post.
END FLOOR BEAM
Checkered expansion plate bent to fit crown of roadway, beveled edge.
Top flange inside 1L 6"x4"x½" bent to fit crown of roadway.
* Top flange outside 1L 6"x6"x⅜" bent to fit crown of roadway.
Bottom flange inside 1L 6"x3½"x½"
Bottom flange outside 1 plate 6½"x⅜", 1 pl. 3½"x⅜".
Web plate 37"x⅜" cut to crown of roadway.
* Note: Top flange outside for one floor beam between spans - 1L 8"x6"x⅜" bent. Use 6"x3½"x⅜" stiffener ∟ under 8" leg of flange ∟ and 3½"x⅜" Fills. (See detail on sheet 2)
INTERMEDIATE TERMINAL OF RAILING
END TERMINAL OF RAILING
Stop on this line for intermediate terminal of railing.
Provide 15'-0" vertical clearance
Spacing 'P' not over 4½" at ℄ girder.
One intermediate rail post in each panel.
Collision rail connections to truss to be reamed in field and bolted after pouring concrete floor
Notch cover plate to extend between gusset plates at L0
Symmetrical about ℄ except as shown.
END VIEW
LONGITUDINAL SECTION
7 Panels @ 20'-0" = 140'-0" c. to c. bearings.
Close joint
SECTION B-B.
Bring backwall angle into proper position by bolting to forms and remove bolts securely to forms and remove bolts through the expansion plate before casting concrete.
HALF PLAN AND SECTION BOTTOM AND LATERAL SYSTEM
DETAIL SHOWING LATERAL SUPPORT.
1⅛" bolt with square nuts
1⅛"⌀ Hole for 1⅛" bolt support.
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS
WASHINGTON, D.C.
TYPICAL STEEL SPAN
140'-0" C. TO C. BEARINGS 20'-0" ROADWAY
CONCENTRATED LIVE LOAD - 2-15 TON TRUCKS.
LAYOUT
SCALES IN FEET.
DETAILS
CORRECT O. L. Grover
BRIDGE ENGINEER
APPROVED
CHIEF ENGINEER
Sheet 1 of 2
G-371.
Rev 4-18-28
DESIGNED BY
DRAWN BY
TRACED BY
CHECKED BY



TYPICAL CROSS SECTION

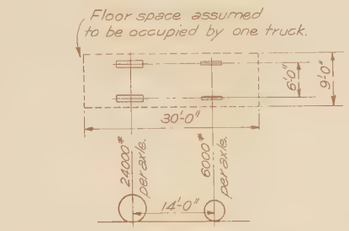
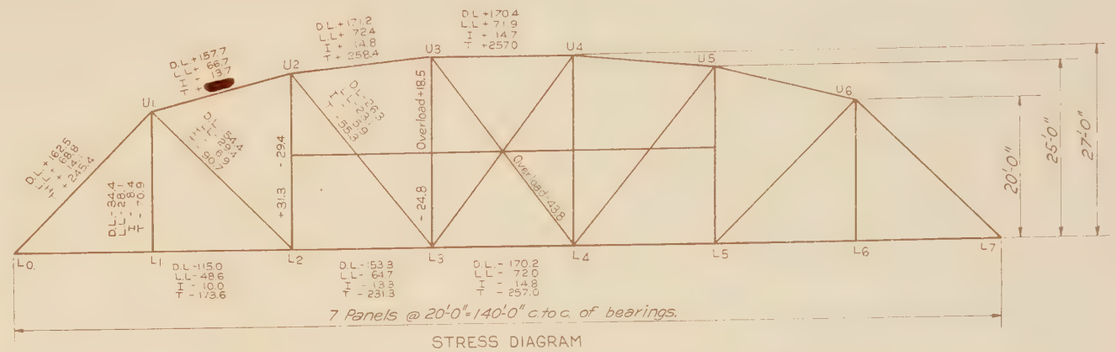
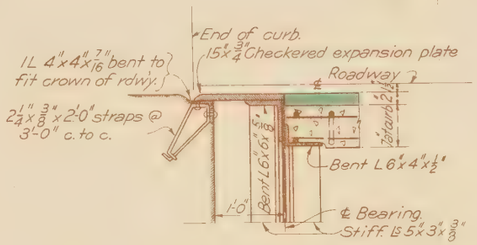


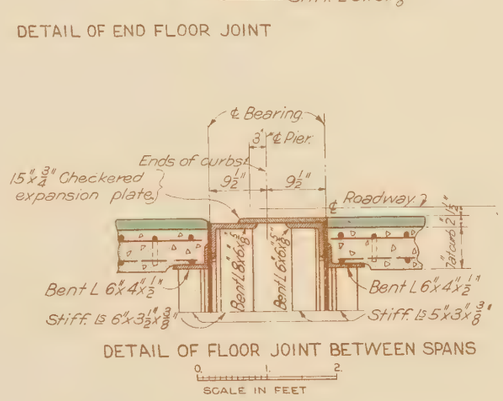
DIAGRAM OF TYPICAL 15 TON TRUCK



STRESS DIAGRAM



DETAIL OF END FLOOR JOINT



DETAIL OF FLOOR JOINT BETWEEN SPANS

GENERAL NOTES.

Specifications: Materials and workmanship Standard Specifications for Highway Bridges and Incidental Structures of the A.A.S.H.O. July 1, 1927.

Rivets: ¾" ϕ Open holes 13/16" ϕ except as noted.

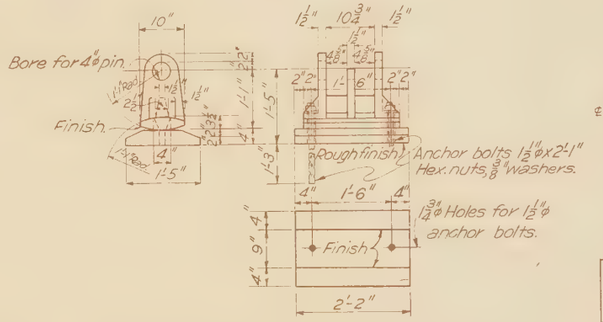
Reaming: Field connections to be sub punched and reamed according to Specifications.

Alternate Sections shown in Table may be used but payment will be based on weights shown on details.

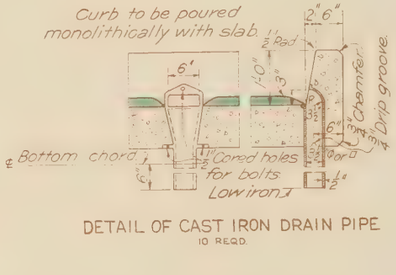
Camber: D.L. deflection +2".

Paint: Shop coat, red lead 95% pure and raw linseed oil. First field coat white lead 65% to 75%, zinc white 35% to 25%, and raw linseed oil. Second field coat same as field coat tinted with lamp black as directed.

Approval of Plans: Shop plans must be approved by the Bureau of Public Roads before fabrication is started.



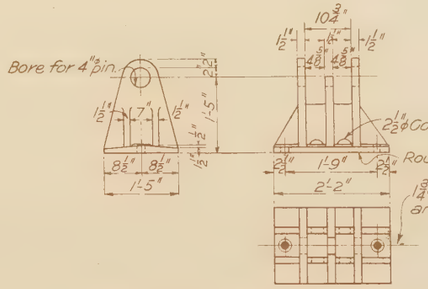
CAST STEEL ROCKER-EXPANSION END



DETAIL OF CAST IRON DRAIN PIPE
10 REQD.

TABLE SHOWING ALLOWABLE ALTERNATE SECTIONS
* Turn long legs of angles out.

MEMBER		AMER. STD. SEC.	
INT. FLOOR BEAMS	*	4 @ 6"x4"x⅜" WEB PL ⅜"x 28"x ⅜"	30" C.B. 115#
INSIDE STRINGERS		20" I 65.4#	20" BI 59.6#
OUTSIDE STRINGERS		18" I 54.7#	18" C.B. 47#
U1-L1, U2-L2, U3-L3	*	4 @ 3½"x3"x 5/16" PL 7⅛"x 5/16"	8 @ 5" C.B. 31#
U1-L2, U2-L3	*	4 @ 3½"x3"x 5/16" PL 7⅛"x 5/16"	8 @ 5" C.B. 31#



CAST STEEL SHOE - FIXED END.

ESTIMATE OF QUANTITIES.

Concrete Class "A"	75 cu. yds.
Reinforcing steel	14000 lbs.
Structural steel	160000 lbs.
Cast steel shoes	2700 lbs.
Cast iron drains	1100 lbs.
Surfacing	306 sq. yds.
Galvanized pipe (with fittings)	280 lin. ft.

U.S. DEPARTMENT OF AGRICULTURE.
BUREAU OF PUBLIC ROADS.
WASHINGTON, D.C.

TYPICAL STEEL SPAN
140'-0" C. TO C. BEARINGS - 20'-0" ROADWAY
CONCENTRATED LIVE LOAD 2-15 TON TRUCKS

0 1 2 3 4 5
SCALE, IN FEET.

C.B. Geisler Mch. 1927.
DESIGNED BY H. W. Morgan DATE June 1926
DRAWN BY H. L. Morgan DATE July 1927
TRACED BY P. F. [illegible] DATE July 1927
CHECKED BY C.B. Geisler DATE Oct. 1927

CORRECT O. L. Grover
BRIDGE ENGINEER
APPROVED B. F. Wilson
CHIEF ENGINEER

Sheet 2 of 2

G-372

Retraced F.M.D 3-31-28

CLEARANCE DIAGRAM.

SECTION B-B

END TERMINAL OF RAILING

DETAIL OF PORTAL

All portal members to have 2½"x⅝" single lacing and intermediate ties 8"x⅝"x1'-6" long at ends of members and 10" long at intermediate points. Gusset plates ⅜" thick.

Provide 15'-0" vertical clearance.

TOP LATERALS

2 Lˢ 3"x3"x5/16", S.L. 2½"x5/16" End tie pls. 12"x5/16"x1'-0" 5/16" Lateral plates.

HALF PLAN AND SECTION OF TOP CHORD.

Typical rivet spacing in top chord and end post.

INTERMEDIATE TERMINAL OF RAILING.

Stop on this line for intermediate terminal of railing.

Spacing 'p' not over 4'-2" at ℄ girder.

END VIEW.

END FLOOR BEAM

3/4" Checkered expansion plate bent to fit crown of roadway, beveled edge.
Top flange inside 1 L 6"x4"x1" bent.
* Top flange outside 1 L 6"x6"x⅝" bent.
Bottom flange inside 1 L 6"x3½"x⅜"
Bottom flange outside 1 Pl. 6½"x⅝", 1 Pl. 3½"x⅜"
4 Conn. Lˢ 3½"x3½"x7/16", 4 fills 6½"x⅜"
* 10 Stiff. Lˢ 5"x3½"x⅜", 7 fills 3⅝"x⅜", 1 fills 3½"x⅜"
Web pl. 38⅜"x5/16" cut to crown of roadway.
* Note: Top flange outside for one floor beam between spans - 1 L 8"x6"x⅝" bent. Use 6"x3½"x⅜" stiff. Lˢ under 8" leg of flg. L, and 3½"x⅝"x5" fill. (See detail sheet 2.)

Bring backwall angle into proper position by bolting to expansion plate, then bolt securely to forms and remove bolts through expansion plate before casting concrete.

Holes @ 3'0" ctrs.

Stiffener Lˢ to bear on upper flange Lˢ

℄ Roadway.

℄ Bearing.

LONGITUDINAL SECTION

Mill U1 U2 U3

2-12" I-35# 1 Cov. pl. 16"x⅝"

2-12" I-30# 1 Cov. pl. 16"x⅜"

2-12" I-30# 1 Cov. pl. 16"x7/16"

5/16" Splice pls.

2 Lˢ 4"x3½"x7/16" bent.

2 Lˢ 5"x3½"x⅝" 2½"x5/16" Single lacing - 45° Tie pls. 8"x5/16"x7¼"

Collision rail connections to truss to be reamed in field after pouring concrete floor, and bolted.

1 Bar 2½"x⅝" between tie plates on one diagonal for lacing.

Symmetrical about ℄ except as shown.

Tie pls. 2 Lˢ 3½"x3½"x⅜" Net area req'd 20.0"

78.7" Beth G-295#

78.7" Beth H-27#

Net area req'd 61.0"

Net area req'd 42.0"

Net area req'd 12.1"

Net area req'd 16.0"

Net area req'd 18.0"

2 Lˢ 4"x3½"x⅝"

2 Lˢ 4"x3"x⅝"

2 Lˢ 3"x3"x5/16"

2 Lˢ 4"x3"x⅝"

2½"x(766)# Galv. pipe. Coupling, blank one side.

⅝" Rivets @ 4" spa.

1 L 3"x4"x5/16

1 L 3"x3"x⅜" Fill

⅜" Fill

5/16" Pl.

1 L 3"x3½"x5/16

Exterior stringer.

Interior stringer.

Sec. A-A

1 L 3"x5"x⅝"

One intermediate rail post in each panel.

Close joint.

L 4

L 3

L 2

L 1

L 0

7 Panels @ 22'-10 1/4" = 159'-11 3/4" c. to c. bearings.

Gusset plates ⅜" except as noted.

10"x⅞" Pin pls.

4 11/16" Pin, recessed pin nuts.

11"x⅝" Splice pls.

2-12" I-25# Net area req'd. 12.1"

2-12" I-35# Net area req'd. 16.0"

2-12" I-35# Net area req'd. 18.0"

End tie pls. 15"x5/16"x1'-6"

Int. tie pls. 15"x5/16"x9" @ 3'0" ctrs.

3½"x⅜" Splice bars on outside ℄ and bottom flange inside ℄.

End tie pls. 15½"x⅝"x1'-6"

15½"x⅝" Splice pls.

1 L 3½"x3½"x7/16"

1 L 3"x3½"x5/16"

Lateral plates 5/16" except as noted.

Hole for entering anchor bolt

1 L 5"x3½"x7/16"

HALF PLAN AND SECTION BOTTOM CHORD AND LATERAL SYSTEM

1⅛" Bolt with square nuts.

1 L 6"x3½"x⅜"

DETAIL SHOWING LOWER LATERAL SUPPORT

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS
WASHINGTON, D.C.

TYPICAL STEEL SPAN

159'-11 3/4" C. TO C. BEARINGS 20'-0" ROADWAY
CONCENTRATED LIVE LOAD 2-15 TON TRUCKS.

LAYOUT. 0 1 2 3 4 5 6. SCALES IN FEET.
DETAILS. 0 1 2 3.

CORRECT. O. L. Grover BRIDGE ENGINEER

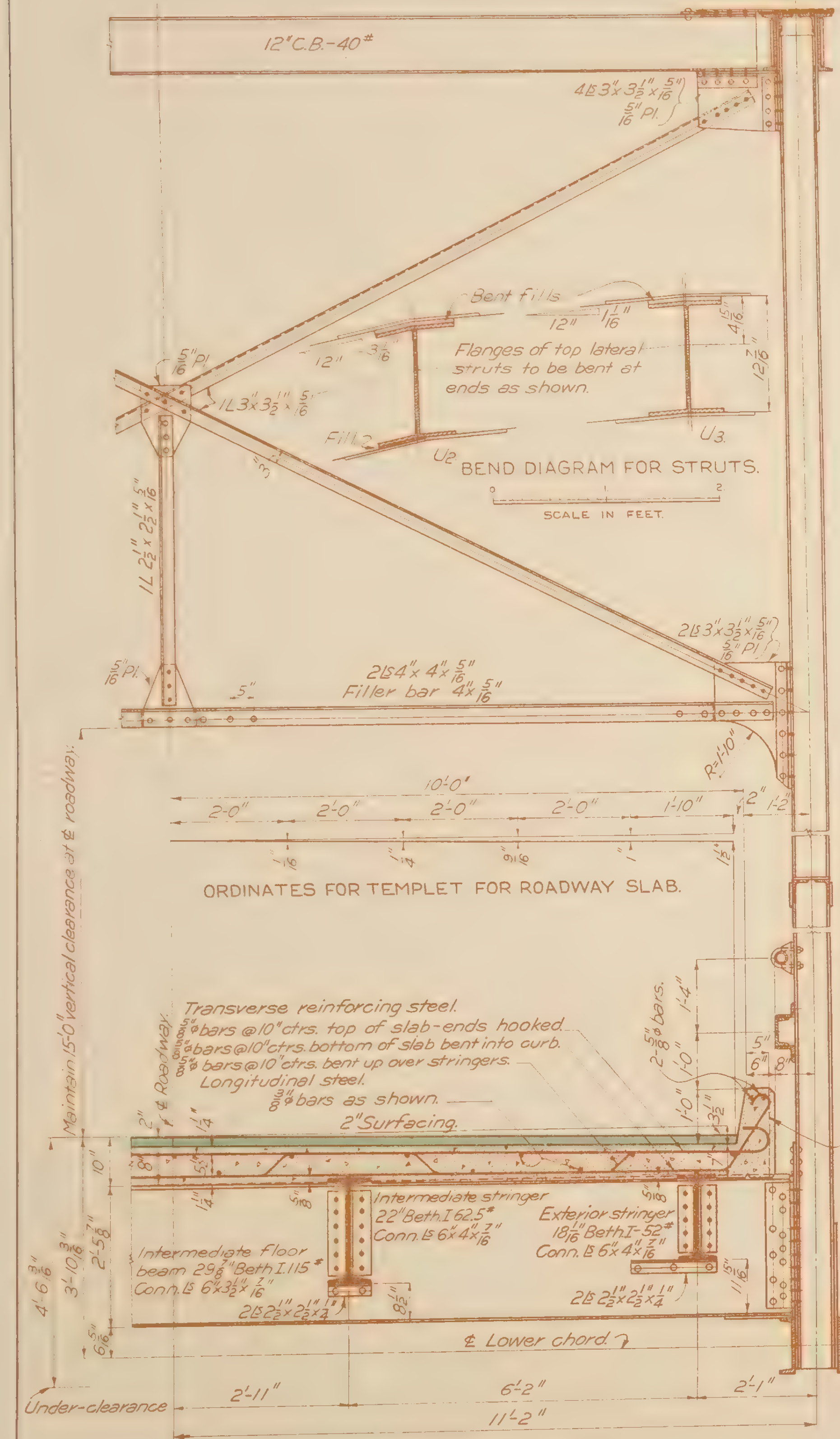
APPROVED. B. P. Wilson CHIEF ENGINEER.

DESIGNED BY N. W. Morgan DATE Aug 1926
DRAWN BY N. W. Morgan DATE Aug 1926
TRACED BY J. M. & S.S.B. DATE Oct 1927
CHECKED BY C. B. Conrad DATE

Sheet 1 of 2.

G-354.

Redrawn Oct. 1927. N.W.M.
Rev. 4-18-28.



TYPICAL CROSS SECTION

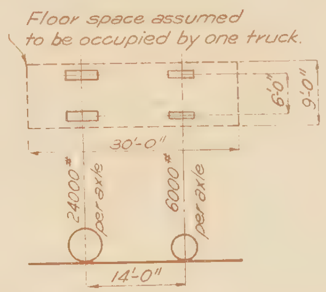
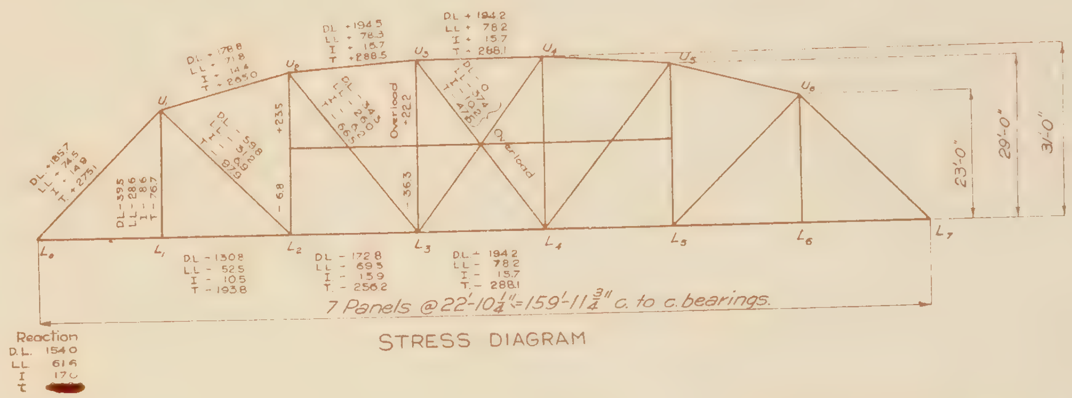
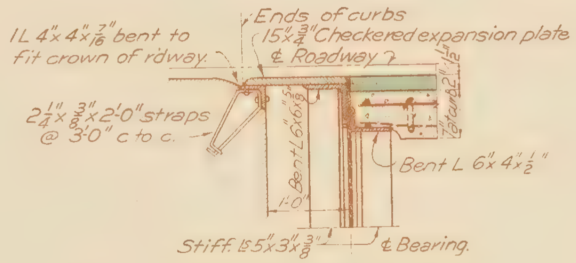


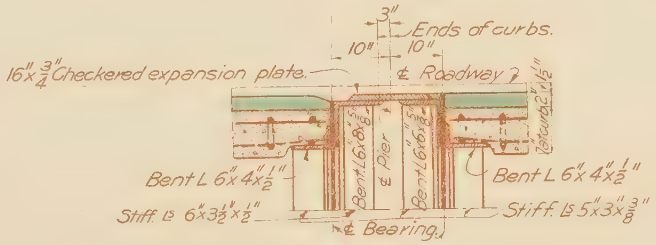
DIAGRAM OF TYPICAL 15 TON TRUCK.



STRESS DIAGRAM

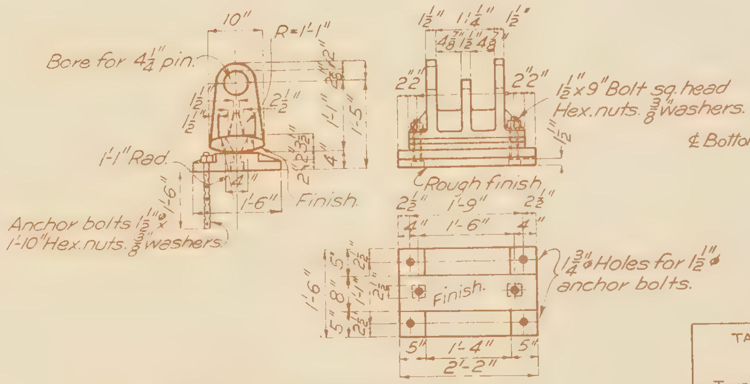


DETAIL OF END FLOOR JOINT

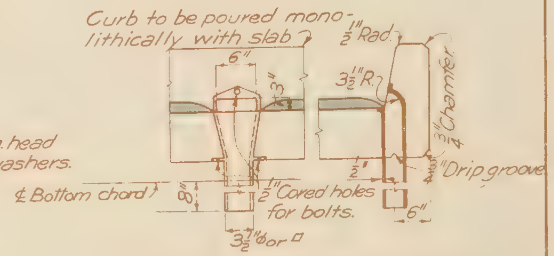


DETAIL OF FLOOR JOINT BETWEEN SPANS

SCALE IN FEET.

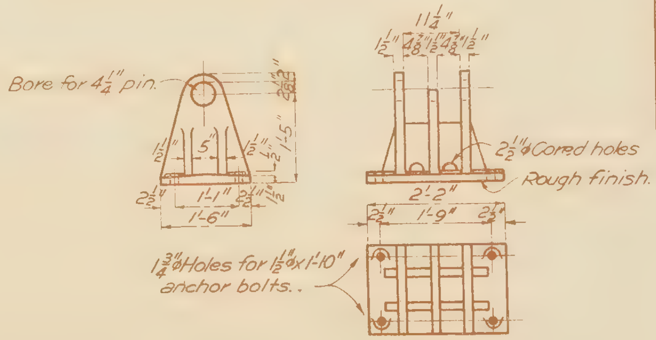


CAST STEEL ROCKER-EXPANSION END.



DETAIL OF CAST IRON DRAIN.
12 Req'd.

TABLE SHOWING ALLOWABLE ALTERNATE SECTIONS Turn long legs of angles out.		
MEMBER	AMER. STD. SEC.	
INT. FLOOR BEAMS	4 Ls 6"x4"x 9/16", 1 Pl. 30"x 3/8"	30" C.B. 115#
INSIDE STRINGERS	24" I - 79.9#	21 1/8" C.B.-64#
OUTSIDE STRINGERS	18" I - 60#	18 7/64" C.B. 52#
VERTICALS	4 Ls 4"x3"x 5/16", 1 Pl. 7½"x 5/16"	8 1/16" C.B. 31#
U_1-L_2	4 Ls 3"x3"x 5/16", 1 Pl. 7½"x 5/16"	8 1/16" C.B. 31#
TOP STRUT	4 Ls 4"x3"x 5/16", 1 Pl. 12"x 5/16"	11½" Beth. Col. 40.5#
U_2-L_3	4 Ls 3x3x 5/16", 1 Pl. 7½"x 5/16"	8 1/16" C.B. 31#



CAST STEEL SHOE - FIXED END

GENERAL NOTES.

Specifications: Materials and workmanship Standard Specifications for Highway Bridges and Incidental Structures of the A.A.S.H.O. July 1, 1927.

Rivets: ¾"φ except in rail channels. Open holes 13/16"φ.

Reaming: Field connections to be sub-punched and reamed according to Specifications.

Alternate Sections shown in Table may be used but payment will be based on weight of sections shown on details.

Camber: D. L. deflection + 2½".

Paint: Shop coat, red lead 95% pure and raw linseed oil. Field coat, white lead 65% to 75%, zinc white 35% to 25%, and raw linseed oil. Second field coat same as first field coat tinted with lamp black as directed.

Approval of Plans: Shop plans must be approved by the Bureau of Public Roads before fabrication is started.

ESTIMATE OF QUANTITIES.

Concrete Class "A"	857 cu. yds.
Reinforcing steel	16000 lbs.
Structural steel	187000 lbs.
Cast steel shoes	2800 lbs.
Cast Iron drains	1300 lbs.
Galvanized pipe (with fittings)	320 lin. ft.
Surfacing	350 sq. yds.

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS.
WASHINGTON, D.C.

TYPICAL STEEL SPAN

159'-11¾" C. TO C. BEARINGS 20'-0" ROADWAY.
CONCENTRATED LIVE LOAD 2-15 TON TRUCKS.

SCALE IN FEET.

CORRECT. O. L. Grover
BRIDGE ENGINEER.

APPROVED. [signature]
CHIEF ENGINEER.

Sheet 2 of 2.

G-355.
Rev. 4-18-28

DESIGNED BY N. W. Morgan DATE Aug. 1926
DRAWN BY N. W. Morgan DATE July 1926
TRACED BY E. M. O. & S. B. L. DATE Nov. 1927
CHECKED BY C. R. Geisler DATE " "

CLEARANCE DIAGRAM

DETAILS OF LATERAL BRACING

HALF PLAN AND SECTION OF TOP CHORD.

SECTION B-B

DETAIL OF PORTAL

END TERMINAL OF RAILING.

INTERMEDIATE TERMINAL OF RAILING.

END VIEW

END FLOOR BEAM

3/4"ø Checkered expansion plate bent to fit crown of roadway, beveled edge.
Top flange inside 1 L 6"x4"x 1/2" bent.
Top flange outside 1-L 6"x 6" x 5/8" bent.
Bottom flange inside 1-L 6"x 3 1/2"x 1/2".
Bottom flange outside 1 Pl. 6 1/2"x 5/8" | Pl. 3 1/2"x 3/8"
4 Conn. Ls 3 1/2"x 3 1/2"x 1/16", 4 fills 6 1/2"x 5/8".
* 10 Stiff Ls 5"x 3 1/2"x 3/8", 7 fills 3"x 3/8", 3 fills 3"x 1/2".
Web pl. 38 1/4"x 5/16" cut to crown of roadway
* Note: Top flange outside for one floor beam between spans - 1 L 8"x 6"x 5/8" bent. Use 6"x 3 1/2"x 3/8" stiff Ls under 8" leg of flange L and 3 1/2"x 3/8" fill (See detail sheet 2)

Bring backwall angle into proper position by bolting to expansion plate then bolt securely to forms and remove bolts through expansion plate before casting concrete.

DESIGNED BY [illegible] DATE July 1926
DRAWN BY [illegible] DATE July 1926
TRACED BY Sketch P. DATE Nov. 1927
CHECKED BY C.D. Greiner DATE " "

HALF PLAN AND SECTION
BOTTOM CHORD AND LATERAL SYSTEM

LONGITUDINAL SECTION

DETAIL SHOWING LOWER LATERAL SUPPORT.

Lateral plates 5/16" except as noted.

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS
WASHINGTON D.C.

TYPICAL STEEL SPAN

180'-0" C. TO C. BEARINGS 20'-0" ROADWAY.
CONCENTRATED LIVE LOAD 2-15 TON TRUCKS.

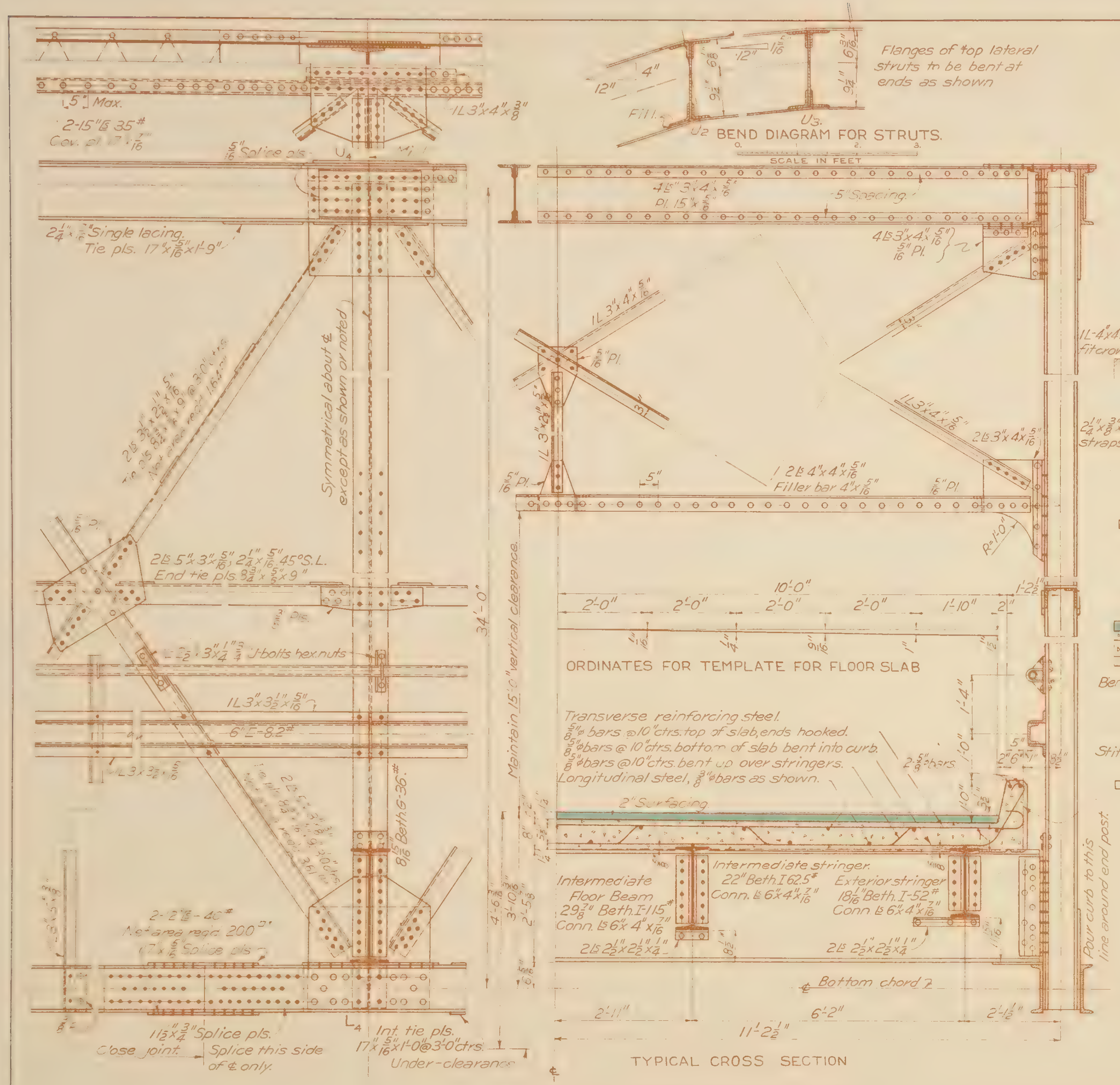
LAYOUT 0 1 2 3 4 5 6 SCALES IN FEET
DETAILS 0 1 2 3

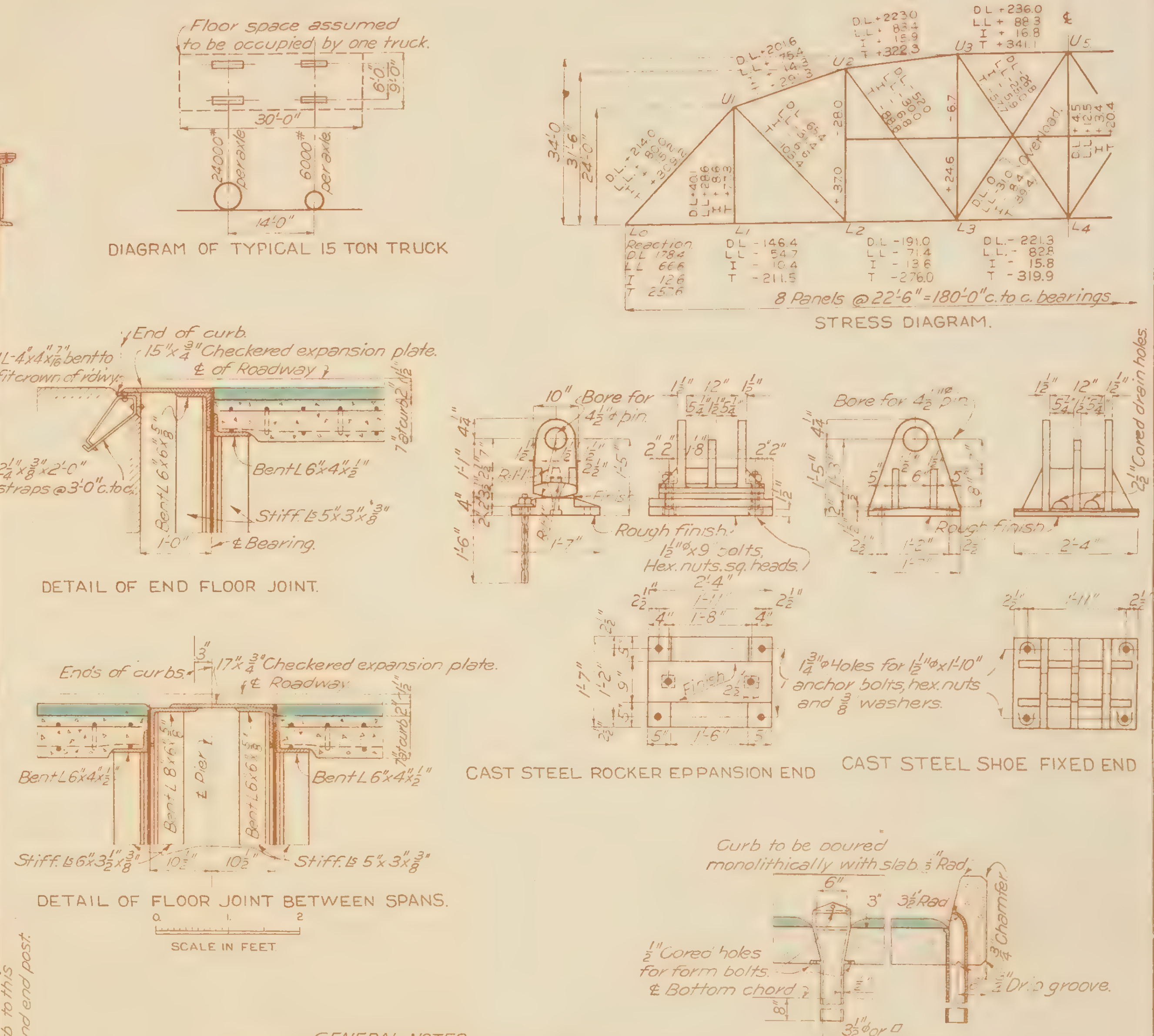
CORRECT O. L. Grover BRIDGE ENGINEER.
APPROVED [illegible] CHIEF ENGINEER.

Sheet 1 of 2.

G-356.

Redrawn Nov. 1927 P.F.B
Rev. 4-18-28.





DETAIL OF CAST IRON DRAIN
(12 Req'd.)

TABLE SHOWING ALLOWABLE ALTERNATE SECTIONS.		
*Turn long legs of angles out.		
MEMBER	AMER. STD. SEC.	
INT. FLOOR BEAMS	4 Ls 6"x 4"x 9/16", 1 Pl 30"x 3/8"	30" C.B. 115*
INSIDE STRINGERS	24" I 79.9#	21 1/8" C.B.-64#
OUTSIDE STRINGERS	18" I 60#	18 7/64" C.B. - 52#
U_1L_2, U_2L_3.	4 Ls 3"x 3"x 5/16", 1 Pl 8 1/2"x 5/16"	8 15/16" BETH. G-36*
VERTICALS	4 Ls 4"x 3"x 5/16", 1 Pl 8 1/2"x 5/16"	9" C.B. 38#

ESTIMATE OF QUANTITIES.

Concrete Class 'A'	96.5	cu. yds.
Reinforcing steel	18000	lbs.
Structural steel	232000	lbs.
Cast steel shoes	3100	
Cast Iron drains	1300	lbs.
Galvanized pipe (with fittings)	360	lin. ft.
Surfacing	393	sq. yds.

GENERAL NOTES

Specifications: Materials and workmanship Standard Specifications for Highway Bridges and Incidental Structures of the A.A.S.H.O. July 1, 1927.
Rivets: 3/4"φ except in rail channels. Open holes 13/16"φ.
Reaming: Field connections to be sub-punched and reamed according to Specifications.
Alternate Sections, shown in Table may be used but payment will be based on weight of sections shown on details.
Camber: D.L. deflection + 2 3/4".
Paint: Shop coat, red lead 95% pure and raw linseed oil. Field coat white lead 65% to 75%, zinc white 35% to 25% and raw linseed oil. Second field coat same as first field coat tinted with lamp black as directed.
Approval of Plans: Shop plans must be approved by Bureau of Public Roads before fabrication is started.

DESIGNED BY C.T. Barnard / R.W. Morgan DATE July 1926
DRAWN BY R.W. Morgan DATE July 1926
TRACED BY F.H.S. DATE Nov. 1927
CHECKED BY C.B. Grover DATE " "

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS.
WASHINGTON, D.C.

TYPICAL STEEL SPAN

180'-0" C. TO C. BEARINGS 20'-0" ROADWAY.
CONCENTRATED LIVE LOAD 2-15 TON TRUCKS.

0. 1 2. 3.
SCALE IN FEET.

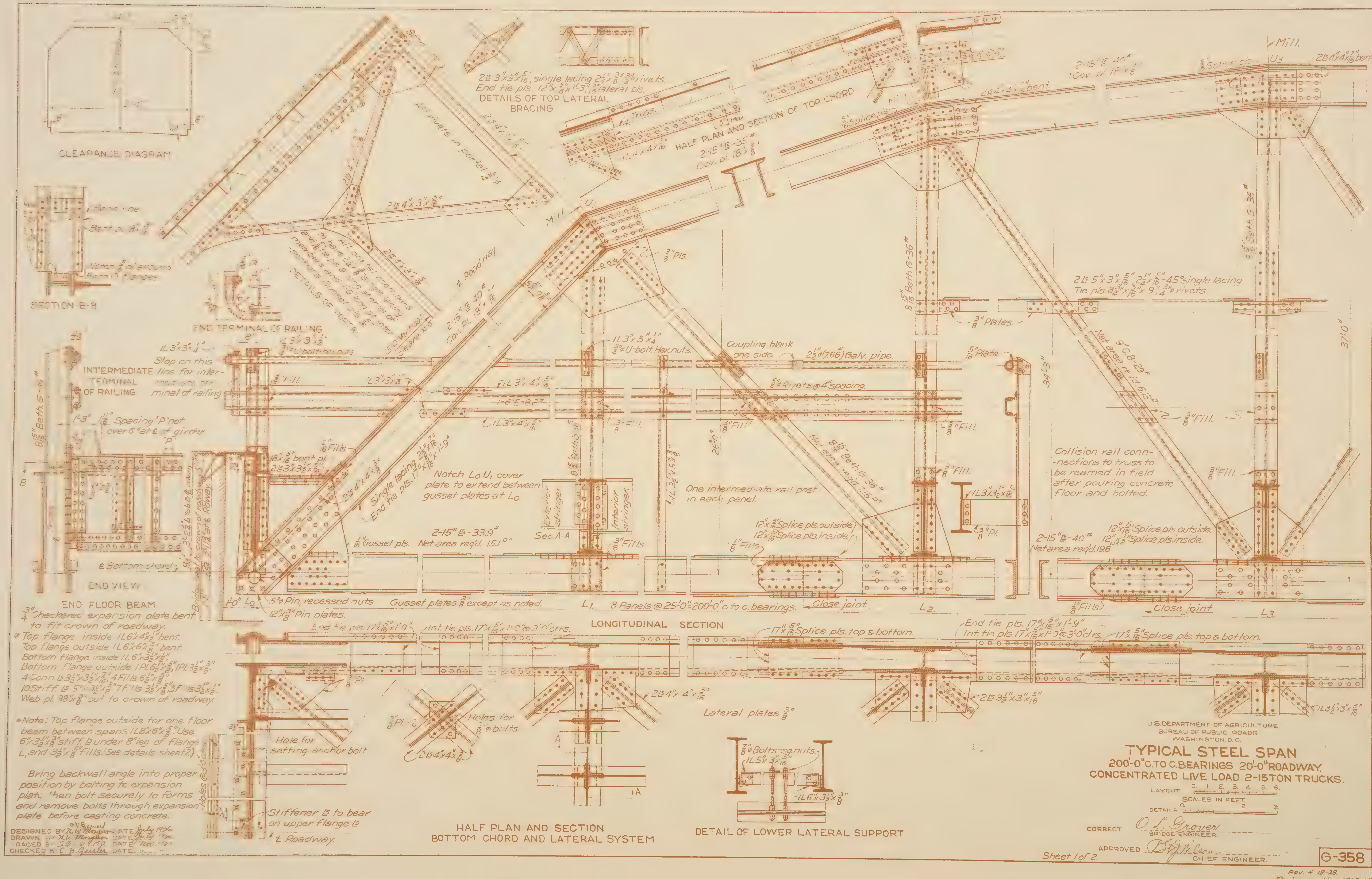
CORRECT. O. L. Grover
BRIDGE ENGINEER.

APPROVED. T. H. MacDonald
CHIEF ENGINEER

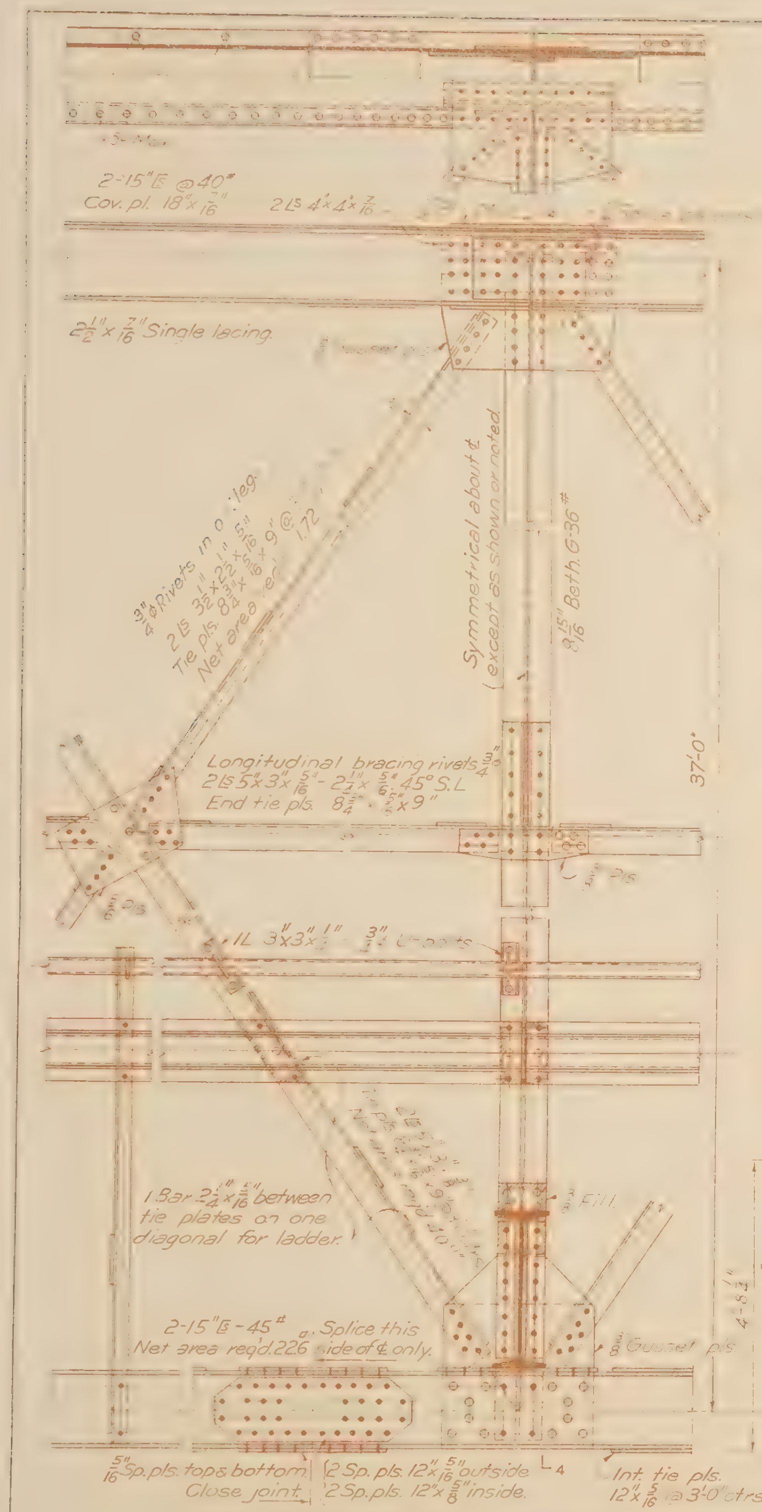
Sheet 2 of 2.

G-357.

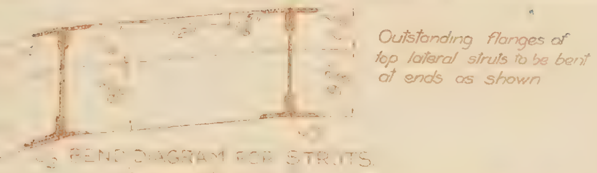
Redrawn Nov. 1927 S.B.L.
Rev 4-18-28



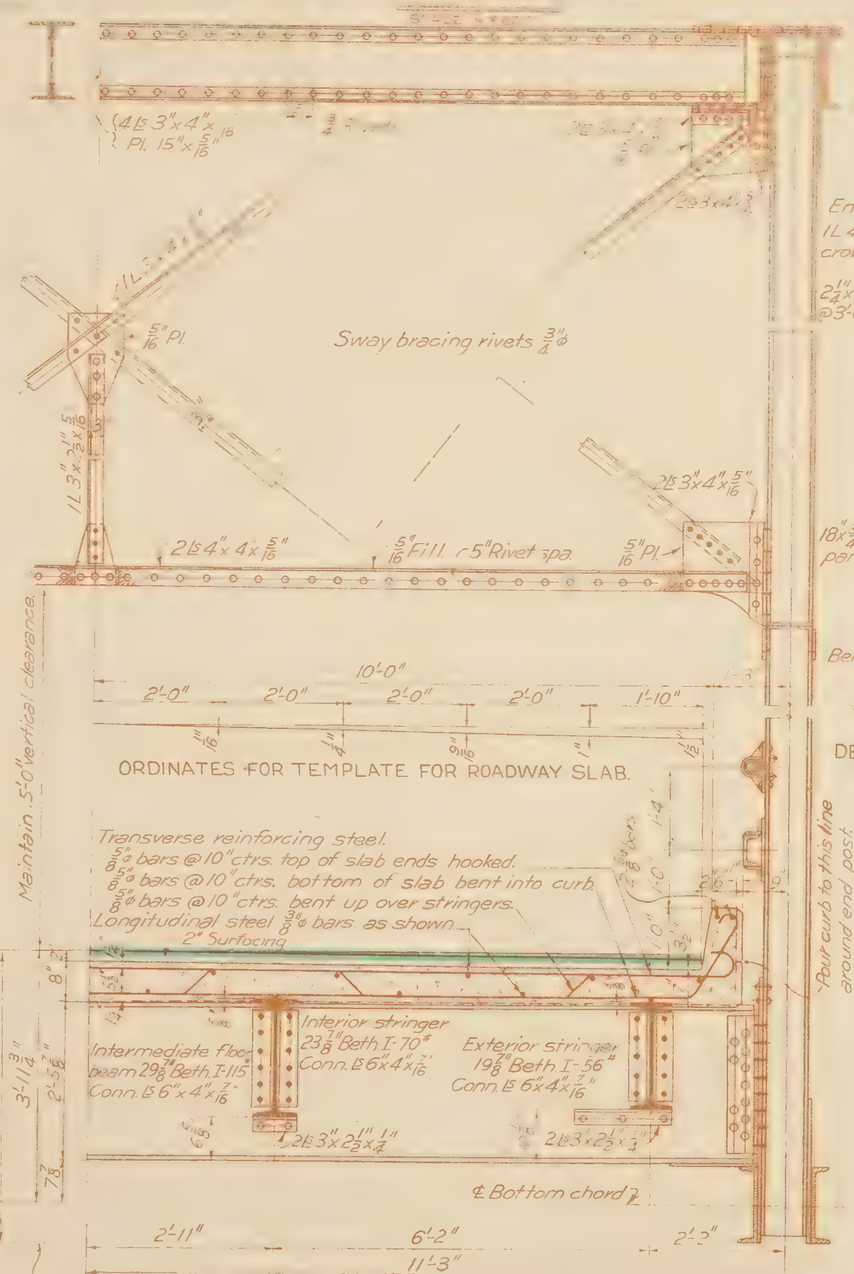
Rev. 4-18-28
Redrawn Nov. 1927 N.W.M.



LONGITUDINAL SECTION AT CENTER



BEND DIAGRAM FOR STRUTS



TYPICAL CROSS SECTION

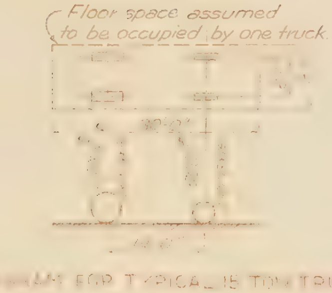
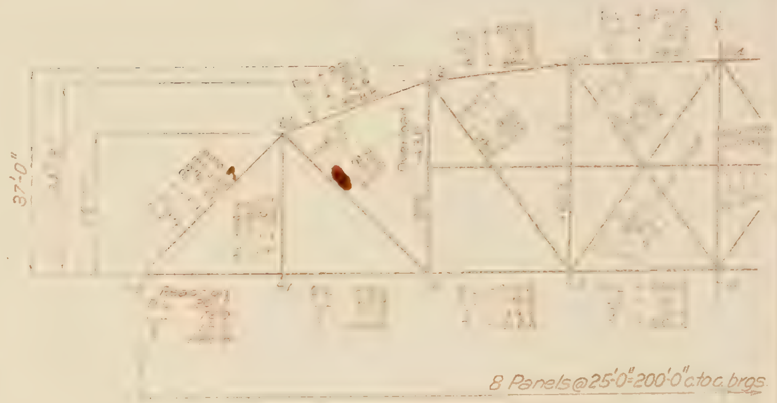
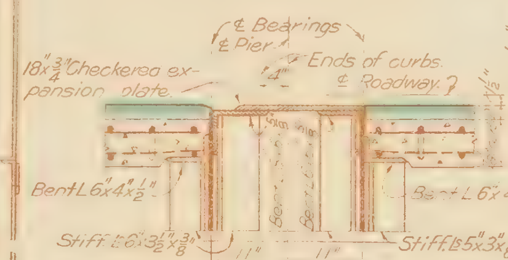


DIAGRAM FOR TYPICAL 15 TON TRUCK

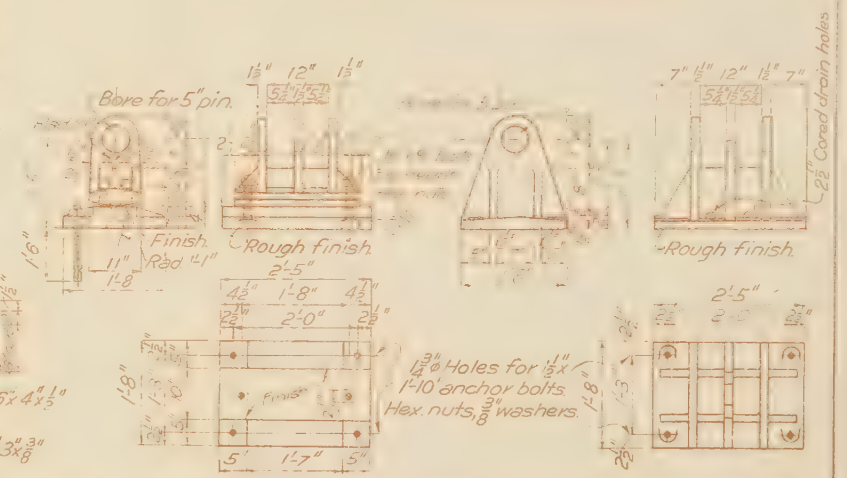


STRESS DIAGRAM.

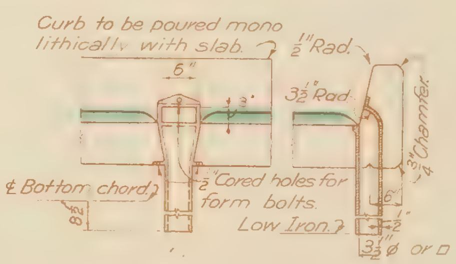
DETAIL OF END FLOOR JOINT



DETAIL OF FLOOR JOINT BETWEEN SPANS.



CAST STEEL ROCKER-EXPANSION END. CAST STEEL SHOE-FIXED END.



DETAIL OF CAST IRON DRAIN
(12 Reqd.)

GENERAL NOTES.

Specifications: Materials and workmanship Standard Specifications for Highway Bridges and Incidental Structures of the A.A.S.H.O. July 1, 1927.
Rivets, ⅞" ⌀ and open holes 15/16" ⌀ except as noted.
Reaming: Field connections to be sub-punched and reamed according to Specifications.
Alternate Sections shown in Table may be used but payment will be based on weight of sections shown on details.
Camber: D. L. deflection +3"
Paint: Shop coat, red lead 95% pure and raw linseed oil. Field coat, white lead 65% to 75%, zinc white 35% to 25%, and raw linseed oil. Second field coat same as first field coat tinted with lamp black as directed.
Approval of Plans: Shop plans must be approved by the Bureau of Public Roads before fabrication is started.

TABLE SHOWING ALLOWABLE ALTERNATE SECTIONS

* Turn long legs of angles out.

MEMBER	AMER. STD. SEC.	CARNEGIE
INT. FLOOR BEAMS *	4 Ls 6" x 4" x 9/16", 1 Pl. 30" x ⅜"	30" C.B. 115#
INSIDE STRINGERS	24" I - 79.9#	24" C.B. 70#
OUTSIDE STRINGERS	20" I - 65.4#	21" C.B. 58#
VERTICALS *	4 Ls 4" x 3" x 5/16", 1 Pl. 8½" x 5/16"	9" C.B. 38#
U - L2, U2 - L3 *	4 Ls 3½" x 3" x 5/16", 1 Pl. 8½" x 5/16"	do

ESTIMATE OF QUANTITIES.

Concrete Class "A" .... 107.5 cu. yds.
Reinforcing steel .... 20000 lbs.
Structural steel .... 269000 lbs.
Cast steel shoes .... 3400 lbs.
Cast Iron drains .... 1550 lbs.
Galvanized pipe (with fittings) .. 400 lin. ft.
Surfacing .... 438 sq. yds.

DESIGNED BY [illegible] DATE [illegible]
DRAWN BY [illegible] DATE [illegible]
TRACED BY [illegible] DATE [illegible]
CHECKED BY [illegible] DATE [illegible]

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS
WASHINGTON, D.C.

TYPICAL STEEL SPAN

200'-0" C. TO C. BEARINGS 20'-0" ROADWAY.
CONCENTRATED LIVE LOAD 2-15 TON TRUCKS.

0. 1. 2. 3.
SCALE IN FEET

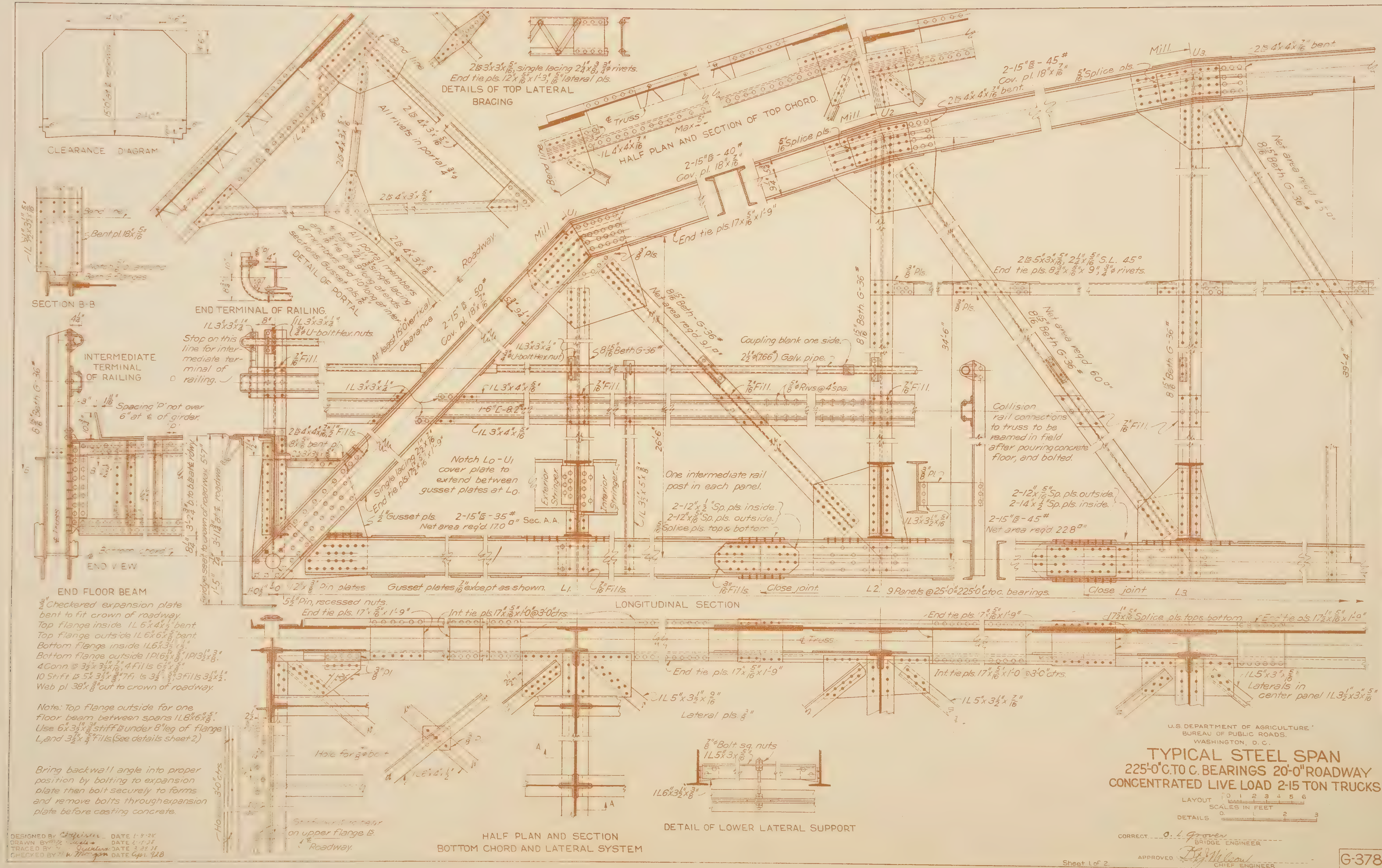
CORRECT O. L. Grover
BRIDGE ENGINEER

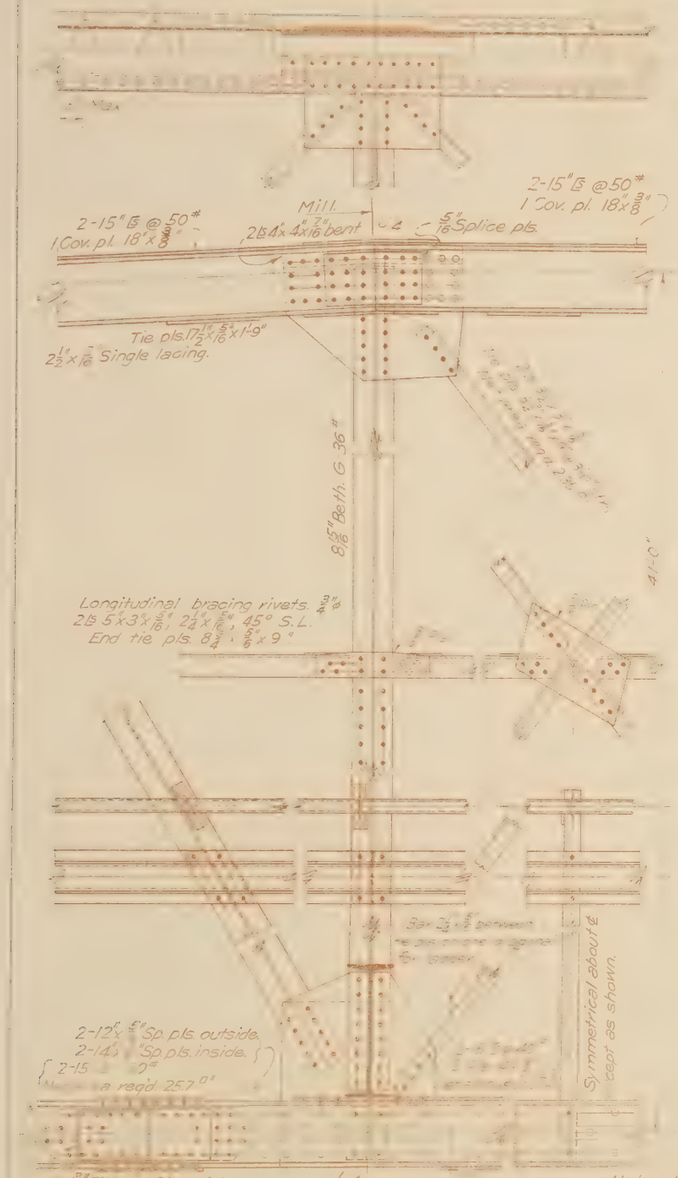
APPROVED B. H. [illegible]
CHIEF ENGINEER

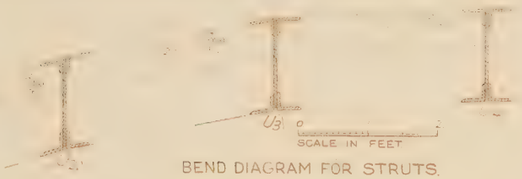
Sheet 2 of 2

G-359.

Redrawn Nov. 1927 S.B.L.
Rev. 4-18-28


CLEARANCE DIAGRAM
DETAILS OF TOP LATERAL BRACING
HALF PLAN AND SECTION OF TOP CHORD.
DETAIL OF PORTAL
SECTION B-B
END TERMINAL OF RAILING.
INTERMEDIATE TERMINAL OF RAILING
END VIEW
END FLOOR BEAM
LONGITUDINAL SECTION
HALF PLAN AND SECTION BOTTOM CHORD AND LATERAL SYSTEM
DETAIL OF LOWER LATERAL SUPPORT
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS.
WASHINGTON, D. C.
TYPICAL STEEL SPAN
225'-0" C. TO C. BEARINGS 20'-0" ROADWAY
CONCENTRATED LIVE LOAD 2-15 TON TRUCKS
SCALES IN FEET
BRIDGE ENGINEER
CHIEF ENGINEER
Sheet 1 of 2.
G-378





BEND DIAGRAM FOR STRUTS.

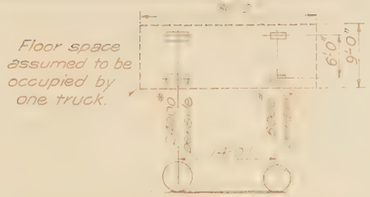
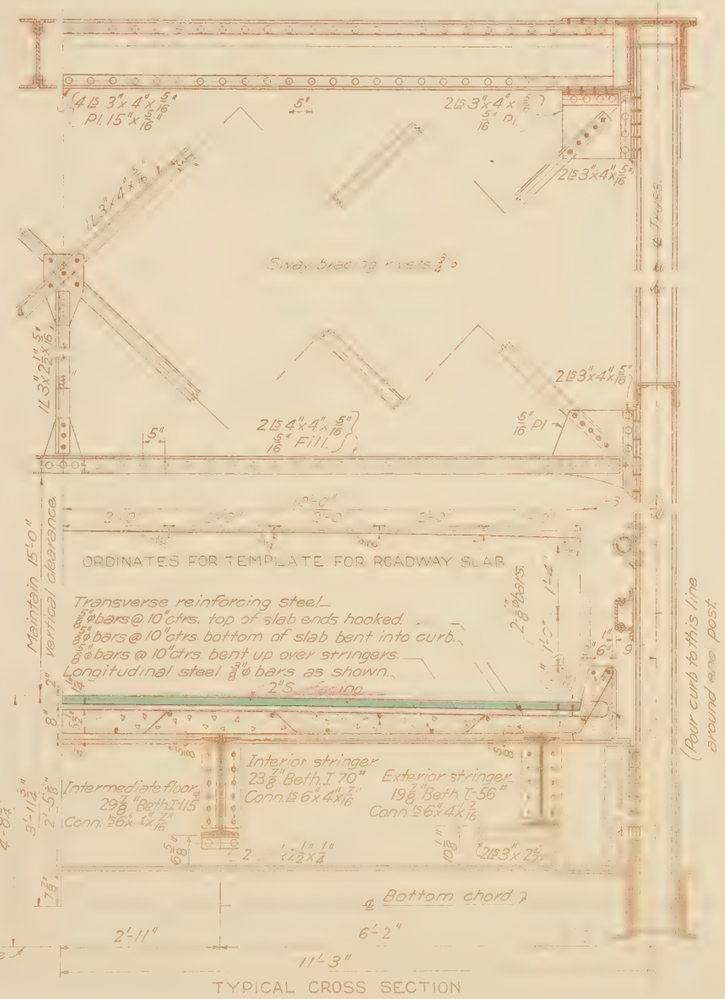
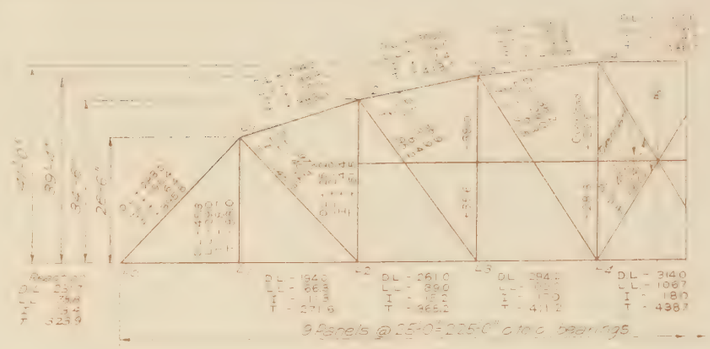
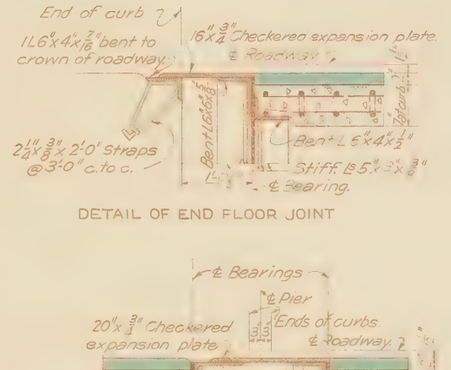


DIAGRAM FOR TYPICAL 15 TON TRUCK.

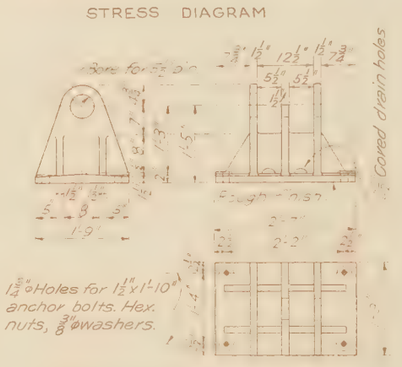




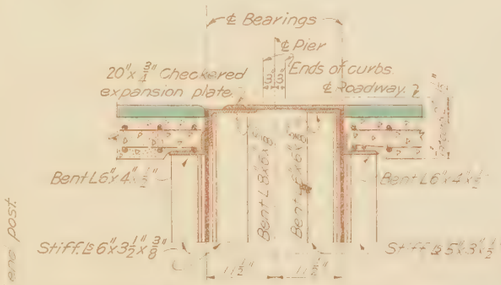
STRESS DIAGRAM



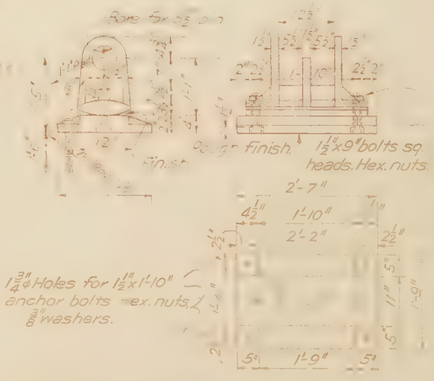
DETAIL OF END FLOOR JOINT



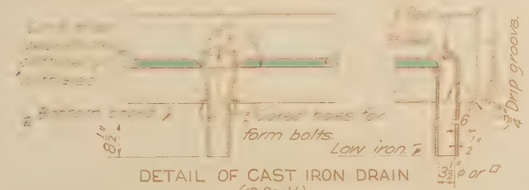
CAST STEEL SHOE FIXED END



DETAIL OF FLOOR JOINT BETWEEN SPANS



CAST STEEL ROCKER EXPANSION END



DETAIL OF CAST IRON DRAIN
(12 Reqd.)

TABLE SHOWING ALLOWABLE ALTERNATE SECTIONS.
* Turn long legs of angles out.

MEMBER		AMER. STD. SEC.	CARNEGIE
INT. FLOOR BEAM	*	41℄s 6"x 4"x 9/16", 1 Pl. 30"x 5/16"	30" C.B. 115#
INSIDE STRINGERS		24" I - 79.9#	24" C.B. 70#
OUTSIDE STRINGERS		20" I - 65.4#	20" C.B. 66#
VERTICALS	*	41℄s 4"x 3"x 5/16", 1 Pl. 8"x 5/16"	9" C.B. 38#
U1 - L2	*	41℄s 4"x 3"x 9/16", 1 Pl. 8"x 9/16"	do.
U2 - L3 U3 - L4	*	41℄s 3 1/2"x 3"x 7/16", 1 Pl. 8"x 7/16"	do.

ESTIMATE OF QUANTITIES.

Concrete Class "A"	121.0 cu. yds.
Reinforcing steel	22500 lbs
Structural steel	320000 lbs
Cast steel shoes	3700 lbs.
Cast iron drains	1550 lbs.
Galvanized pipe (with fittings)	450 lin. ft.
Surfacing	493 sq. yds.

GENERAL NOTES

Specifications: Materials and workmanship Standard Specifications for Highway Bridges and Incidental Structures of the A.A.S.H.O. July 1, 1927.

Rivets: 3/4" ø and open holes 15/16" ø except as noted.

Reaming: Field connections to be subpunched and reamed according to Specifications.

Alternate Sections, shown in Table may be used. Payment will be based on weight of sections shown on details.

Camber: D. L. deflection +3 1/2".

Paint: Shop coat, red lead 95% pure and raw linseed oil. First field coat white lead 65% to 75%, zinc white 35% to 25%, and raw linseed oil. Second field coat same as first field coat tinted with lamp black as directed.

Approval of Plans: Shop plans must be approved by the Bureau of Public Roads before fabrication is started.

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS
WASHINGTON, D.C.

TYPICAL STEEL SPAN
225'-0" C. TO C. BEARINGS 20'-0" ROADWAY
CONCENTRATED LIVE LOAD 2-15 TON TRUCKS

0 1 2 3
SCALE IN FEET.

DESIGNED BY C. Quirk DATE Jan. 28
DRAWN BY [illegible] DATE 2-1928
TRACED BY [illegible] DATE 2-25-28
CHECKED BY W. W. Morgan DATE Apr. 1928

CORRECT O. E. [illegible]
BRIDGE ENGINEER
APPROVED. B. H. Nelson
CHIEF ENGINEER

Sheet 2 of 2

G-379

CLEARANCE DIAGRAM

DETAILS OF TOP LATERAL BRACING

SECTION B-B

END TERMINAL OF RAILING

DETAIL OF PORTAL

INTERMEDIATE TERMINAL OF RAILING

END FLOOR BEAM

End floor beam 29⅞" Beth. I 115 lbs.
Bottom flange outside to be stripped 2" from ℄ of web.
4" Conn. ls 6"x4"x7/16" Brackets 2-½" Pls. and 4 ls 4"x4"x⅜".

Bring backwall angle into proper position by bolting to expansion plate then bolt securely to forms and remove bolt through expansion plate before casting concrete.

LONGITUDINAL SECTION

DETAIL OF LOWER LATERAL SUPPORT.

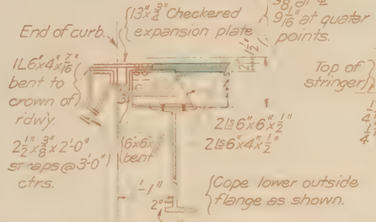
DETAIL OF CAST IRON DRAIN. 1/2 REQ.

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS
WASHINGTON, D. C.

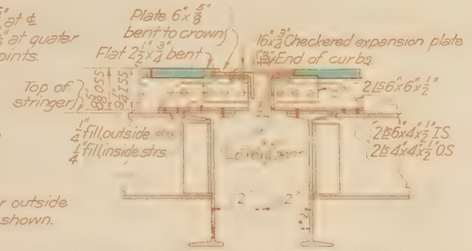
TYPICAL STEEL SPAN
250'-0" C. TO C. BEARINGS 20'-0" ROADWAY
CONCENTRATED LIVE LOAD 2-15 TON TRUCKS

CORRECT - O. K. Grover BRIDGE ENGINEER

6381



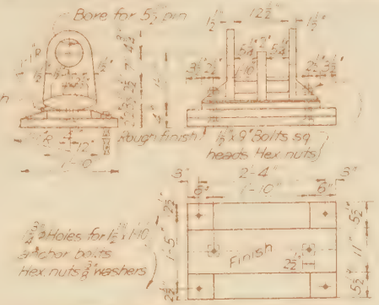
DETAIL OF END FLOOR JOINT
SECTION BETWEEN STRINGERS



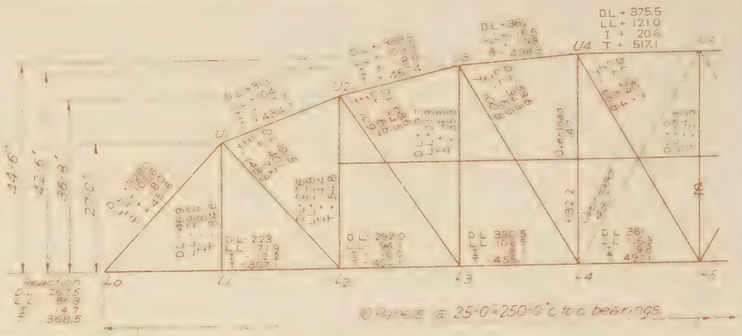
DETAIL OF FLOOR JOINT BETWEEN SPANS
SECTION AT STRINGERS

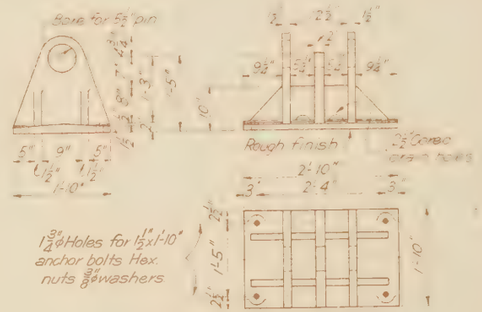
ESTIMATE OF QUANTITIES.

Concrete Class 'A'	135.5 cu. yds
Reinforcing steel	25200 lbs
Structural steel	40000 lbs
Cast steel shoes	4100 lbs
Cast iron drains	1550 lbs
Galv. pipe (with fittings)	500 lin. ft
Surfacing	550 sq. yds.



CAST STEEL ROCKER EXPANSION END





CAST STEEL SHOE FIXED END

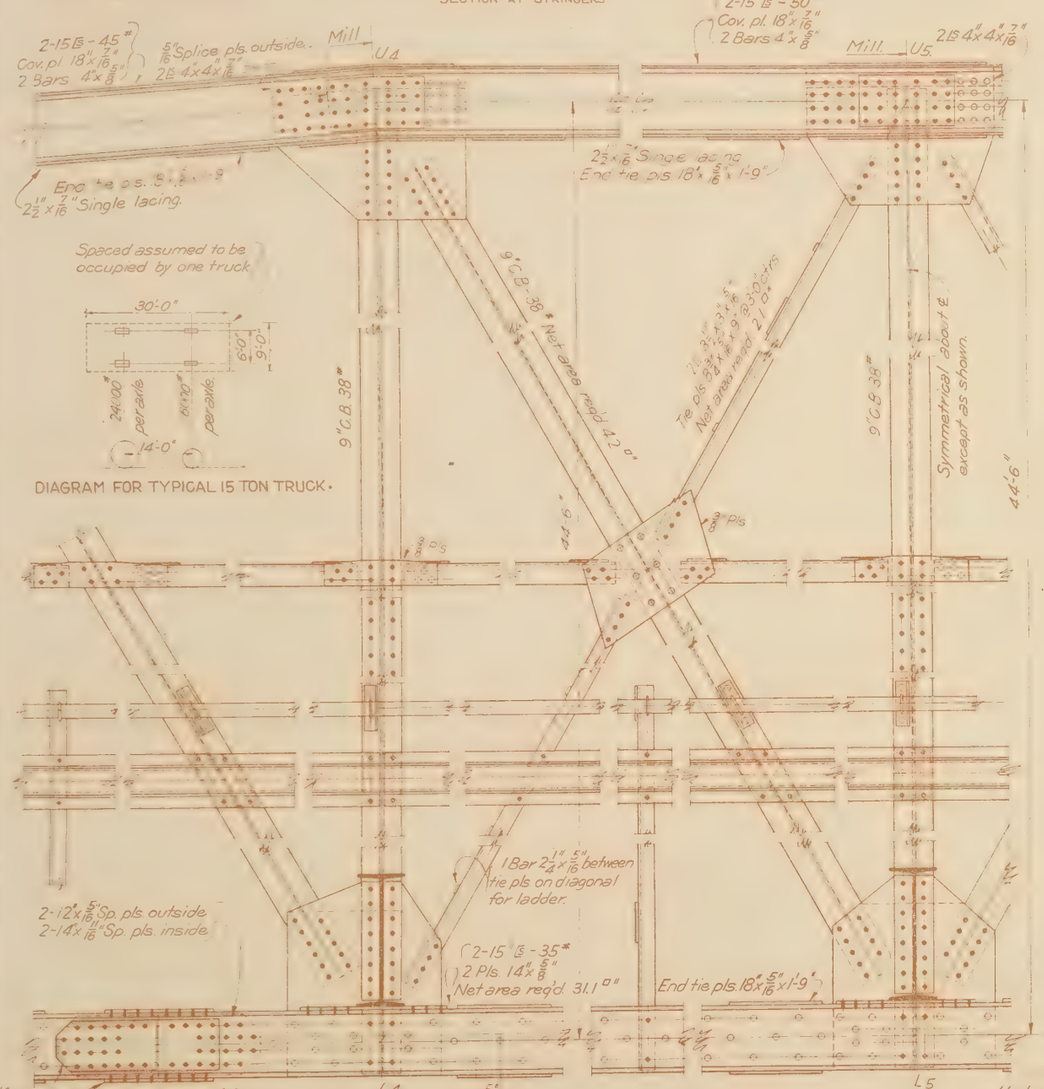
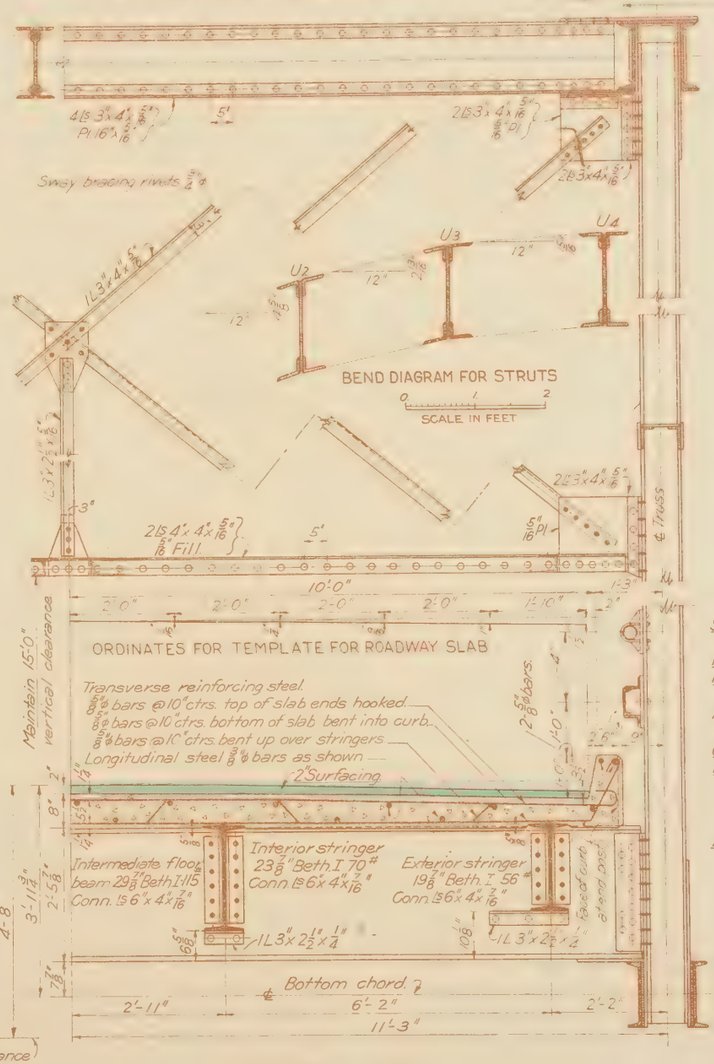


DIAGRAM FOR TYPICAL 15 TON TRUCK.

LONITUDINAL SECTION AT CENTER

Laterals in panel L4-L5; 1L 4"x 3"x 3/8"



TYPICAL CROSS SECTION

TABLE SHOWING ALLOWABLE ALTERNATE SECTIONS
Turn long legs of angles out.

MEMBER	AMER. STD. SEC.	CARNEGIE
INT. FLOOR BEAM	4 Lbs 6"x 4"x 7/16" Pl. 30"x 7/16"	30" C.B. 115#
INSIDE STRINGERS	24" I - 79.9#	24" C.B. 70#
OUTSIDE STRINGERS	20" I - 65.4#	21" C.B. 58#
VERTICALS	4 Lbs 4 1/2"x 3"x 7/16" Pl. 8 1/2"x 7/16"	8 15/16" B.G. 36#
U1-L2 U2-L3	4 Lbs 4"x 3"x 7/16" Pl. 8"x 7/16"	9" B.G. 38.5#
U3-L4 U4-L5	4 Lbs 3 1/2"x 3"x 7/16" Pl. 8 1/2"x 7/16"	8 15/16" B.G. 36#

GENERAL NOTES

Specifications: Materials and workmanship Standard Specifications for Highway Bridges and Incidental Structures. A.A.S.H.O. July, 1927.
Rivets: 7/8"¢ and open holes 15/16"¢ except as noted.
Reaming: Field connections to be sub-punched and reamed according to Specifications.
Alternate Sections, shown in Table may be used but payment will be based on weight of sections shown on details.
Camber: D.L. deflection + 3 1/2".
Paint: Shop coat, red lead 95% pure and raw linseed oil. First field coat white lead 65% to 75%, zinc white 35% to 25%, and raw linseed oil. Second field coat same as first field coat tinted with lamp black as directed.
Approval of Plans: Shop plans must be approved by the Bureau of Public Roads before fabrication is started.

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS
WASHINGTON, D.C.

TYPICAL STEEL SPAN
250'-0" C. TO C. BEARINGS 20'-0" ROADWAY
CONCENTRATED LIVE LOAD 2-15 TON TRUCKS

0 1 2 3
SCALE IN FEET

DESIGNED BY C. S. Russell DATE May 1928
DETAILED [illegible] DATE June 1928
TRACED [illegible] DATE [illegible] 1928
CHECKED BY C. E. [illegible] DATE Dec. 1928

CORRECT O. C. Grover
BRIDGE ENGINEER
APPROVED [illegible]
CHIEF ENGINEER

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